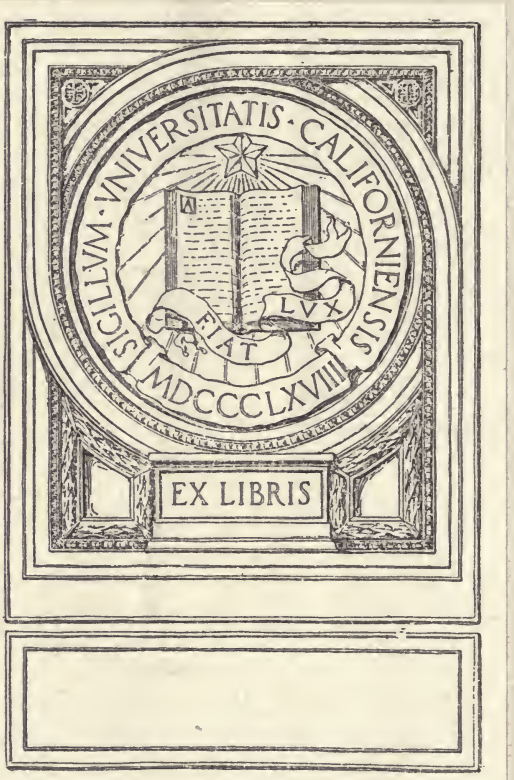
LABOR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TRAINING employees; giving the workman every mechanical advantage to relieve fatigue and multiply results; rousing the team spirit among the men; these are perhaps the three most significant movements in man-handling. Below is one of the evening training classes in automobile instruction in the Hupp Motor works. Noon hour at the Allis-Chalmers works is shown at the top. In the middle appears the famous chassis assembling mechanism at the Ford Motor works, which cut the assembling time per car from 12 hours 28 minutes to 1 hour 33 minutes

SHAW FACTORY MANAGEMENT SERIES

LABOR

HIRING WORKERS—TEACHING MEN TO DO BETTER WORK—WAGE-PAYMENT PLANS AND HOW TO USE THEM—KEEPING WORKERS FIT

A. W. SHAW COMPANY
CHICAGO NEW YORK
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Part I

BUILDING UP THE FORCE

AUTHORITIES AND SOURCES FOR PART I

Chapter I. Robert G. Valentine, Chairman, Massachusetts Minimum Wage Commission and industrial engineer, contributes this chapter from his confidential experiences with the labor situation in many plants.

Chapters II and III. Contributed by Charles R. Stevenson, general manager, National Veneer Products Company, formerly of Miller, Franklin & Stevenson, efficiency engineers, and the E. R. Thomas Motor Company; Mr. Murphy and Mr. Porter collaborating as to the experience of the Hart-Parr Company, General Fireproof Company, and other concerns.

Chapter IV. The result of collaboration by C. H. Denison, Mr. Murphy, Mr. Porter, and Mr. Thomas. Based upon a study of conditions in more than two hundred plants in many branches of industry, including the Clothcraft plant of Joseph & Feiss, Tabor Manufacturing Company, Inland Steel Company and Universal Portland Cement Company.

Chapter V. Contributed by Mr. Murphy and Mr. Porter from the experience of the National Cash Register Company, Crane Company, Gisholt Company, Hart-Parr Company, Avery Company and others.

UNIV. OF CALIFORNIA

I

LAYING DOWN INDUSTRIAL POLICIES

CIVIL war is a problem in many factories. Armed neutrality between the business and the public has never been uncommon. Both conditions are usually accepted as the unavoidable clash of personalities when in fact they result from mistaken industrial policies and from unsatisfactory arrangements that can be set right.

Two departments in a large ship-building concern have quite different methods for work. Part of the difference is demanded by the difference of work, part is not. And the part that is not leads to constant friction between the two bodies of employees.

The heads of the departments, of course, are loyal each to his own men. A state of war reigns. When things become too bad, the department heads are changed. Personalities, not methods, get the blame. But if two men were the best of friends and were put at the head of these departments, within six months they would be, administratively at least, at each other's throats.

In any concern that is alive and growing, these intense differences of opinion will appear; but if the business is organized like a well-designed machine, differences of opinion will not become issues of principle. They will be like healthy oppositions of nature, as rain and sunlight, up hill and down hill. A resultant of safe progress will always be possible.

As necessary as a safety valve on an engine is it that the personalities in every concern have a permanent common meeting ground where differences of opinion can be fought out—a method of settling conflicts of interest—a conscious policy towards the problem of personality and humanity—so that there is no ir-

responsible spreading of half-baked differences throughout the force.

As regards the public, also, many concerns face the same sort of strife. Not only is the manager responsible for content and team work in his plant, but he is also the connecting link between his business and society. Too often his vision has become ingrown and he has neglected long-standing disputes between the company and his townspeople, the associations his business involves, the public, or the government that lays down hundreds of operating conditions for every enterprise.

Obviously, the desirable thing would be to investigate, to balance, to audit all the personal factors in the business without bias, and by the measure of these facts to correct policies, shift men and plan ahead. Trained outside experience and judgment are needed, or next best, a method under which the manager could get at the evidence, eliminate personal heat and make the conditions sterile to discontent and misunderstanding.

To attain this degree of health, many organizations have initiated what might be called a management inventory or industrial audit. Primarily, such an audit is diagnosis work upon labor conditions in their bearing on the future of the enterprise. Whether ill will and inefficiency result from faulty organization, loose methods of hiring and discharge, failure to train and protect the workers, or from unfair hours and wages solely, the first step—before the advanced methods hereafter described can be applied—is to take a fresh viewpoint, and "open books" with the cold facts. The big accomplishment of a management inventory is to get the existing conditions and history of the working relations in the company on paper, where they can be studied, analyzed and made the basis of sound policy.

EXAMINING A BUSINESS FOR UNHEALTHY SPIRIT AND ITS CAUSES

EXPERIENCE has taught that there are six kinds of personal relationships (Figures I and II) which strongly influence the success of a business. Each of these calls for thorough study, as a possible source of trouble.

Taking first the management within the plant, the audit looks

for arrangements that in human nature are bound to generate friction. Disregard of individual abilities, ambitions and welfare is unearthed. Payment methods that go against the grain are analyzed in their bearing on discontent.

Following with a survey of the relations between the firm and the control it feels from without, the audit challenges the

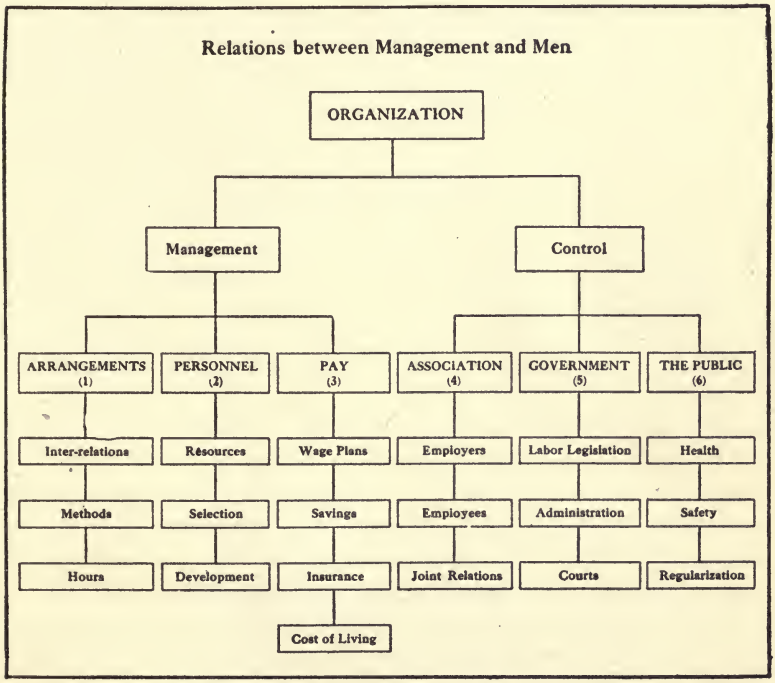


FIGURE I: The first step in taking an audit of the industrial situation in a concern is to divide the relations into those of management and those depending upon outside control. At the left are shown the former, for which the executive head is responsible. To the right are shown the points at which associations, the government and public opinion exercise strong influence

attitude of the management towards the various individual and trade associations that hold power over the business, and seeks to determine the interplay of management policies with governmental control and public good will.

Under the heading of arrangements comes the mapping of the relations of workers among themselves and to the management. Points which have come to the front in this investiga-

tion are the difference in working methods which pitted departments in bitterness against one another, conflicts of authority between foremen, instances where interested persons are required to give decisions that should be unprejudiced, ill-considered disregard for or reversal of instructions, vagueness in defining or explaining duties, merit contests that become rancorous. A very few such criticisms as these, made with the human minimum of prejudice and buttressed with the facts, will give the competent manager a new grip on profits and awaken the concern to a consciousness of itself as a unit—a condition few industrial organizations have yet reached.

ARE YOU PAYING EMPLOYEES WHAT THEY ARE WORTH AND MAKING THEM WORTH MORE?

TO make such facts plain demands virile sincerity in the investigator; to accept such criticism requires bigness in the manager. Often there are stirring times, for it is the facts that cut in business as elsewhere. When the audit continues into questions of the individual's fitness for the position he holds and methods of production, it gets still closer to the heart of the enterprise.

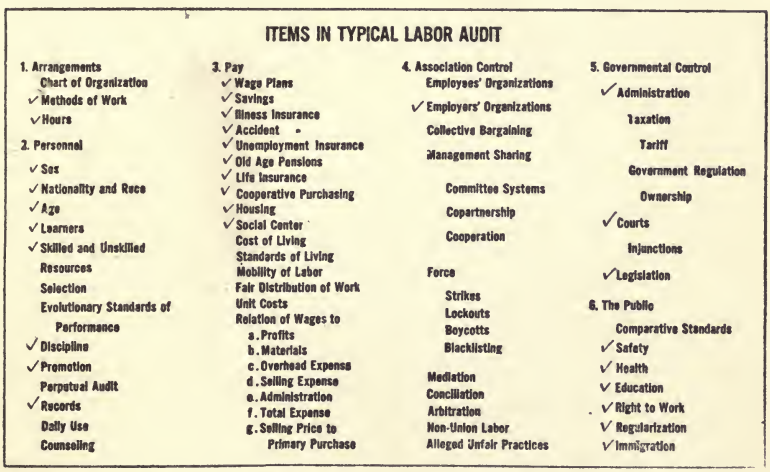
Studies which have covered this heading reveal the fact that few concerns have any business-like line on the way costs are influenced by the sex and age, by the nationality and race of the workers, and by the relations between learners and experienced hands, or between the skilled and unskilled.

In the selecting and training of employees, methods are innumerable, and range from the natural "knack" of some to physical and psychological analysis by the expert who may carry the scientific to the point of super-refinement. Often no means is afforded either the employment manager or the workers to make even a rough estimate of the qualifications and wage value of the latter.

The manager who is determined to have an uncolored view of his personnel will include many such points in his study. It will suggest to him the use of both scientific methods and common sense in judging, assigning and training his workers. It will prompt him, if he has not initiated records, to determine the peculiar aptitudes of all classes of workers, and if he has neg-

lected to do so, to standardize positions and to link them into a chain of promotion. If the team spirit in the business is feeble, his findings will probably challenge any broad policy of filling positions otherwise than by promotion of employees, even including so-called "unskilled" workers. Just as the employment manager is guided by his analysis of individual characteristics, so analysis may also be applied to the natural environment, the training and education, the external qualities and the health of the force.

A thorough inventory of management will be broad enough to reach all the causes of ill will towards the firm not only among workers, but also among those paid off or rejected. One of the most interesting things which took place before the first Minimum Wage Board of Massachusetts, was the statement by representatives of the workers that outright discharge for excessive voluntary absence from work was real kindness, as compared


ITEMS IN TYPICAL LABOR AUDIT

1. Arrangements
   - Chart of Organization
   - ✓ Methods of Work
   - ✓ Hours

2. Personnel
   - ✓ Sex
   - ✓ Nationality and Race
   - ✓ Age
   - ✓ Learners
   - ✓ Skilled and Unskilled
   - Resources
   - Selection
   - Evolutionary Standards of Performance
   - ✓ Discipline
   - ✓ Promotion
   - Perpetual Audit
   - ✓ Records
   - Daily Use
   - Counseling

3. Pay
   - ✓ Wage Plans
   - ✓ Savings
   - ✓ Illness Insurance
   - ✓ Accident
   - ✓ Unemployment Insurance
   - ✓ Old Age Pensions
   - ✓ Life Insurance
   - ✓ Cooperative Purchasing
   - ✓ Housing
   - ✓ Social Center
   - Cost of Living
   - Standards of Living
   - Mobility of Labor
   - Fair Distribution of Work
   - Unit Costs
   - Relation of Wages to
     - a. Profits
     - b. Materials
     - c. Overhead Expense
     - d. Selling Expense
     - e. Administration
     - f. Total Expense
     - g. Selling Price to Primary Purchase

4. Association Control
   - Employees' Organizations
   - ✓ Employers' Organizations
   - Collective Bargaining
   - Management Sharing
   - Committee Systems
   - Copartnership
   - Cooperation
   - Force
   - Strikes
   - Lockouts
   - Boycotts
   - Blacklisting
   - Mediation
   - Conciliation
   - Arbitration
   - Non-Union Labor
   - Alleged Unfair Practices

5. Governmental Control
   - ✓ Administration
   - Taxation
   - Tariff
   - Government Regulation
   - Ownership
   - ✓ Courts
   - Injunctions
   - ✓ Legislation

6. The Public
   - Comparative Standards
   - ✓ Safety
   - ✓ Health
   - ✓ Education
   - ✓ Right to Work
   - ✓ Regularization
   - ✓ Immigration

FIGURE II: For many of the headings given in Figure I scores of items are to be considered. On this list of typical items bearing upon the effectiveness of the organization, the management may check off each point as it is analyzed and covered in the report

with continuing the workers at low aggregate weekly earnings under a failure to furnish full-time employment. The work to be done in this field of regularizing employment in individual concerns and in business generally—for the problem must be

approached from both ends at once—is one of the most needed pioneer works in industry today.

The underlying principle to go on in searching for causes of discontent among the men is just this: Do not expect a management interest from the workers except in return for care of their interests by the management.

In a plant where improved methods of doing business were recently being developed, a sub-foreman was reduced to the grade of an ordinary worker because he said frankly that he did not believe the new plans would work out. The man, happening to have real brains, just as thousands of others like him have, sat up nights devising ways to help smash a system which he felt had led almost directly to his reduction. A little unprejudiced common sense on the part of the management could have won the man's approval of the new methods. Efficiency does not lie in attempting to make a tree grow the way the twig is not inclined. It lies in inclining the twig, not forcing it.

Improved processes are now in the front of every executive's mind. An industrial audit shows not only whether the management has educated itself into a fighting condition keen to improve, but also whether it has remembered to get the workmen convinced. That is the precise point where hundreds of needed improvements have buckled on themselves and where the aggregate of effects, many of them tiny in themselves, have inevitably fed strikes and dissatisfaction costs in many a concern.

Next in the course of the study, check up the effects of amounts and methods of payment, and determine whether they are in the direction of greater content and skill. Money wages received in the weekly envelope are not all; a clean-cut analysis will assemble the total rewards the worker receives. That the bulk of strikes are on wage questions is possibly because the answers to the following questions are not clear in every worker's mind (Figure III).

Where a concern has a minimum wage, is it properly a wage at all? If it does not make healthy living possible, it cannot buy efficiency and contentment.

Can good working conditions properly be regarded as a part of the workers' remuneration?

Is any part whatever of "welfare work" an addition to wages in a proper sense?

Is any other part of "welfare work" legitimate expense for the business?

Where there is a profit-sharing plan, what is its effect on wages?

What is the existing and what the correct relation of benefit and insurance systems to wages?

What part of industrial discontent in the plant centers about the amount of remuneration, what part about the method of remuneration, and what part has some elements of both?

Going over this ground completes an analysis of the internal industrial conditions of a plant, arranged under many significant sub-heads—significant because they affect the costs of the business. The main duty of a well-run business is to keep progressively solvent. It must be able to pull its own weight in the boat, if it is to be really a self-respecting part of life. Therefore, if questions like those of hygiene and safety, decent human organization and self-respecting methods of payment, entirely apart from further developed "welfare work," are not profitable, the audit will here frankly face the fact, drive the problem into the open in such a clean-cut presentation that few people will deny it, and show the management how it is influencing those who live under it. A searching investigation into all of these questions and an honest tabulation of the facts laid bare will reveal the possible sources of trouble that lie within the business, and focus the manager's attention on the vital matters in his labor situation.

AUDITING THE RELATIONS BETWEEN THE BUSINESS AND ITS TRADE CONNECTIONS

THE second half of a management inventory develops similar study of outside levers upon the enterprise. Many industrial establishments today may be likened to a sailboat on a mountain lake. Everything on the boat may be trim. But the managers of the business do not seem as aware as the skippers usually are of the effect of wind dropping onto the lake from the tops of surrounding mountains. Until the squall strikes their

sails, too few managers have any real conception of what the forces are like that are in action around them. Not only will the audit plan afford a first systematic review of those outside factors, but it may eventually enable managers so to organize that something like the amount of time can be spent studying and estimating external trends (as the risk really warrants), which they now spend in studying and estimating material costs, methods and markets. Thus the biggest single steadying influence possible would be brought to bear to counteract present industrial instability.

It is becoming clearer and clearer, for instance, and management audits appear to be contributing largely to this, that for employers to fight labor organizations as organizations is foolish. The helpful thing to do is to admit all that is good in the policies and methods of organized labor and oppose only those that one believes to be wrong. That way the real issue lies.

A broad-minded audit, unflinching to the facts, will cover these points. Limitation of output, for example, is, generally speaking, bad economics. But, the report may remind the manager, it is not a policy followed by trade unions only. There is a good deal of rather pathetic humor in the present industrial situation. Lately a manufacturer was railing against the introduction of outsiders to help the cause of labor, and against the use of the boycott. Within five minutes, however, he risked the guess that another manufacturer who had been responsible for bringing the disturbing elements to the town would live to regret it, because the speaker had already stopped giving him some large orders which he had been accustomed to give, and had passed the word along to other buyers!

The very human question, therefore, of organizations and associations, and of conflicts of opinion, can be so analyzed in an unbiased study of actual conditions as to suggest changes which will pay a dividend in almost any shop.

Individual enterprises and whole industries often adopt unbusiness-like attitudes towards the government and legislation. It has been proved more than once that for the manager and his auditor of conditions to take their bearings in this field pays profits to the concern in good will and relief from friction.

The old method of hiring men (top) was to make a quick choice from the gang at the door. In the well-organized employment department, complete records on each applicant, employee and ex-employee are maintained, comfortable waiting rooms are provided for applicants, and different entrances supplied for men, women and office employees

Judging men by their hands is becoming an art. From the top and to the right the first and third views are the hand of a skilled mechanic, contrasted with the second—that of the shop sweeper. The spatulate fingers and big joints in the fourth view indicate mechanical aptitude, as does the "mechanic's hold" in number five, contrasted with number six. Below is the hand of a blacksmith

Industries have allowed conditions to grow up which have brought labor legislation on their heads. When laws were advocated and an aroused public opinion was forcing them to passage, the business often blindly and bluntly showed fight instead of getting the facts, admitting a sound principle and

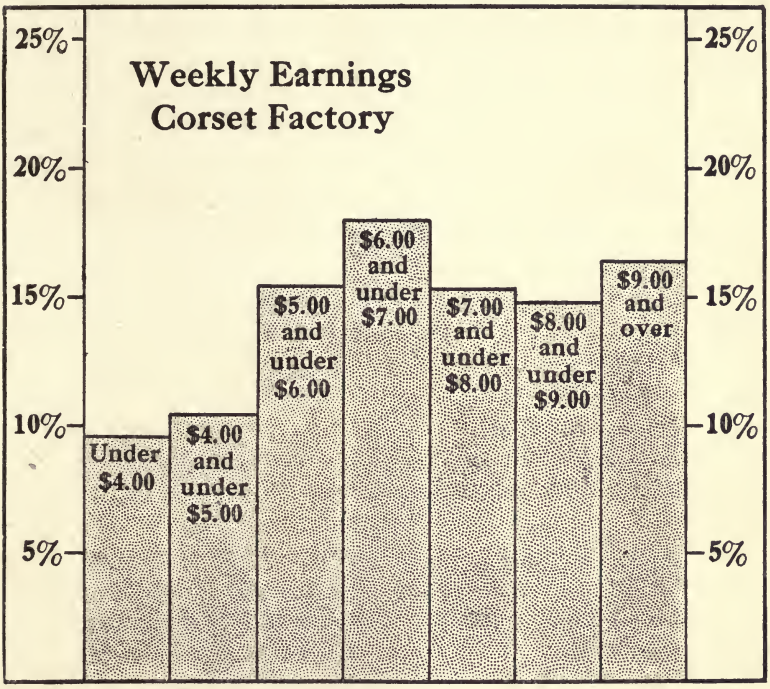


FIGURE III: Having studied the living conditions and requirements of the factory workers, a search for an explanation of any unsatisfactory conditions leads directly to the payroll. Such an analysis as the above, showing 35 per cent of the wage total to be under $6 per week, may explain sickness, easy fatigue, discontent and even worse conditions

helping legislators work out a business-like bill. There are methods and rules of sportsmanship in business which an unbiased study of an organization will develop.

In the last main section of an industrial audit an analysis is made of the relations between the business and its community. Any manager will recognize on thought, that his establishment is above, level with or below the physical, mental, moral and religious standard of its locality. "I am going to

run my business to suit myself; nobody shall dictate to me," is an attitude of employers which shows badly on the balance sheet dealing with the personal factors in the progress of a business. Like the manufacturer who sent his merchandise to China wrapped in paper of a color the Chinese were known to abhor, no business man can find out too soon that the public in the long run is always right.

It is for none of us, however high in authority, to disregard the value of such a study of the business from a detached viewpoint. Up to a few days ago, a certain business official had been doing most of his work by artificial light at a glass-top desk with the electric bulb centered above. A temporary user of the desk coming from daylight work quickly called the eye-strain to his attention. The loss of power in a human being is harder to estimate than in a machine, but no manager or superintendent will deny that the instinct which perceived this handicap in personal efficiency might be similarly valuable throughout the plant. There is a steady, quiet drift of the best workers to places where conditions are best. The concerns that are putting on the market lighting devices, noise-deadening plans, more convenient factory fixtures and recreation plans, are at last making clear in a singularly business-like, unsentimental way, one of the underlying causes in every strike the world has ever seen. Shop accident committees among the men and foremen are helping the management avoid costs of accident and death which far outbalance the cost of prevention. The public, underneath it all, is forcing the consideration of the human factor in industry.

Managers are finding it worth while to save the losses that have always been going on and the hampered or unused human energy, greater still in the aggregate, which might be called conscious or unconscious "dissatisfaction cost."

When a systematic study of the personal factor as it bears upon the profits of the particular business is completed, it consists of these various sorts of material, simply grouped under these headings and numerous subheads.

Evidently, there is nothing fundamentally new about such a plan. It is merely a more methodical way of doing something which every manager has more or less blindly attempted to do

at times. Nor is it a philanthropy. The reason for it is that in the long run it pays. Such data in a number of plants has accomplished interesting results. The ventilation section of the hygiene division of such an audit was recently submitted by itself to a certain concern. Though it contained data under about one hundred and forty-four heads, it put forward few facts that the concern had not known at one time or another. With the submission of all the data in this form and all interrelations made clear, however, the subject took on its true importance and led to action that would otherwise have been delayed.

Following such a study of the conditions and motives that make up the man side of a business, the maker of the report, whether one of the more detached heads of the business himself or an outside engineer, applies his whole experience to the inventory in such a way as to point out (1) the strong points of the concern as he see them, (2) every important weak spot, (3) recommendations. Every effort is made to back the evidence so successfully as to take these conclusions entirely out of the realm of opinion. If the work has been conducted in the proper spirit, it will have eliminated most personal bias and passion from the problem of the human factor.

The necessity for such an inventory of management as that outlined originates in the habit of those in control to begin with site, construction and equipment, rather than building the business as an organization. Confused by increasing industrial and political unrest, managers, responsible for making the business pay its way in the present tense, have not known where to take hold of the problem of human relationship. Now, however, three great principles for dealing with the human side of business problems are appearing:

(1) The wisdom of encouraging not only the organization of employees, but also of employers and then of the complete personnel of each separate concern for collective action.

(2) The necessity of laying open the utmost opportunity for every one in the organization through regularization of work, mobility of labor, work analysis and good engineering and accounting.

(3) The establishment of wise payment plans, based upon the belief that the present wage system must be fundamentally modified. To my mind, no one thing will do more to allay industrial unrest than the certainty that capital and management are not profiting from the business beyond a fixed maximum. The outlines of the future wage system may well be maximum and minimum limits of "advance pay," rounded out with profit sharing.

It is with this sort of vision that the management audit needs to go over all the personal relations of organization, work and pay. No wise man today pretends to know the solution of the labor problem. But a large percentage of the labor difficulties of factory superintendents and executives is due to misunderstandings and failure consciously to develop better personal relations. An industrial audit is the first step in providing for such development. It reveals what stands in the way of good will and united effort. Its findings direct the manager's attention to more advanced methods in employment, accident prevention, reward and profit sharing, scientific training of men and the other matters with which this volume deals. The key to such a study is the chart on page 13, considered in connection with the trends already referred to. Every single feature on this program is by itself in force somewhere and the concern which combines them will in the long run reach greater efficiency as to quality and quantity of production and greater stability than it can otherwise attain, because it will be following along the main currents of human progress.

II

HIRING AND ADVANCING WORKMEN

FOR years a certain plant in a New England manufacturing town had enjoyed a lucrative business on a well-known hardware specialty. The proprietor of this plant had a natural gift for organization and the selection of men. Whenever he found a good man in his own employ he developed and advanced him to positions of constantly increasing responsibility. When a man failed to make progress, he was eliminated, and his place filled by a man who gave more promise of making good.

Whenever this executive came across a good man, though employed by his competitors or his dealers, he made it worth the man's while to join his organization. The result, finally, was picked men in every department, from the sales manager down to the molders.

Handsome profits eventually attracted the attention of outside capital. A new company was then formed to manufacture the article. The promoter was a former sales manager of the original company, who had developed a flaw in the eyes of his employer and had been dropped. He was successful in securing a large amount of capital and proceeded to erect a model plant for the manufacture of the specialty.

So far as physical appliances went, the new factory was far in advance of the other plant. But the ex-sales manager was not a good judge of men. He did not understand how to secure the right human material, and believed that he had all of the ability necessary to create and operate a successful business.

For five years the new business went on at a loss. Then it

was put under the hammer and went to the original manufacturer for about half of what it cost.

This contrast in management emphasizes the value which good organization secured, through careful selection of workers and their painstaking development. Success or failure in any enterprise depends upon the men on its payroll. The business which could be served throughout by men who were one hundred per cent efficient would outdistance all competition.

But the complaint arises from every side that it is impossible to secure really good men. Where and how are they to be had?

Some managers have the faculty of selecting uniformly good men with astonishing regularity, while others are unsuccessful with equally astonishing regularity. Is ability to choose good men an inborn talent, or is it an ability which can be developed through study and experience?

A study of employers and employees in several hundred plants has shown that the ability to secure and employ good men can be cultivated, that its cultivation depends largely on the realization of its importance.

The best place to look for good men is, generally speaking, in your own organization. But this presupposes proper foresight and judgment in employing men to fill the subordinate positions.

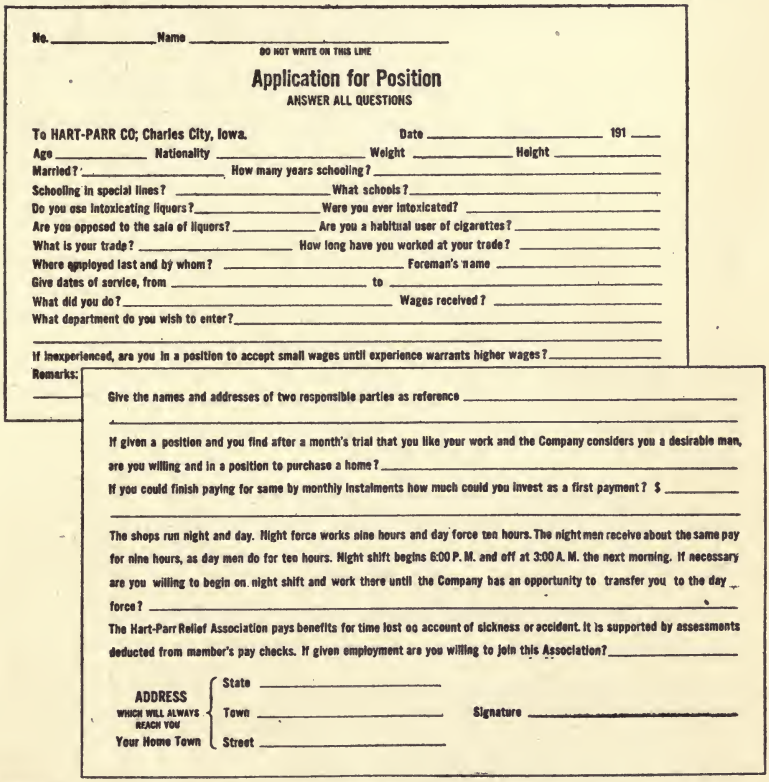
The organization man has a great advantage over the outside man in his knowledge of the technical details of the business and of the policies and ideas of his employer. A man coming into an organization from the outside has so much to learn that for some time his efficiency is apt to be much impaired.

Very few managers are as familiar as they should be with the actual work performed, and the capacities for better work existing in their own organizations. That "familiarity breeds contempt" is an old saying, but a true one. Many managers go outside their own organizations when they could find far better men in their own ranks.

When a young fellow comes to you seeking employment as an office boy or a junior clerk, determine whether he has the latent characteristics and ability which will eventually enable him to fill a more important position. If he has, hire him and you will be making an investment that will net you

many, many times the legal rate of interest. If he has not, do not employ him, for no matter how well he may perform the limited tasks at first imposed upon him, he eventually will become a liability rather than an asset.

Workers in general fall into two classes: hand and head workers. If the hand workers are chosen judiciously, they may be advanced in many instances to positions requiring head work,



No. _____ Name _____

DO NOT WRITE ON THIS LINE

Application for Position

ANSWER ALL QUESTIONS

To HART-PARR CO; Charles City, Iowa. Date _____ 191 ____

Age _____ Nationality _____ Weight _____ Height _____

Married? _____ How many years schooling? _____

Schooling in special lines? _____ What schools? _____

Do you use intoxicating liquors? _____ Were you ever intoxicated? _____

Are you opposed to the sale of liquors? _____ Are you a habitual user of cigarettes? _____

What is your trade? _____ How long have you worked at your trade? _____

Where employed last and by whom? _____ Foreman's name _____

Give dates of service, from _____ to _____

What did you do? _____ Wages received? _____

What department do you wish to enter? _____

If inexperienced, are you in a position to accept small wages until experience warrants higher wages? _____

Remarks:

Give the names and addresses of two responsible parties as reference _____

If given a position and you find after a month's trial that you like your work and the Company considers you a desirable man, are you willing and in a position to purchase a home? _____

If you could finish paying for same by monthly instalments how much could you invest as a first payment? $ _____

The shops run night and day. Night force works nine hours and day force ten hours. The night men receive about the same pay for nine hours, as day men do for ten hours. Night shift begins 6:00 P. M. and off at 3:00 A. M. the next morning. If necessary are you willing to begin on night shift and work there until the Company has an opportunity to transfer you to the day force? _____

The Hart-Parr Relief Association pays benefits for time lost on account of sickness or accident. It is supported by assessments deducted from member's pay checks. If given employment are you willing to join this Association? _____

ADDRESS WHICH WILL ALWAYS REACH YOU Your Home Town

State _____

Town _____ Signature _____

Street _____

FORM I: Experiences differ as to the value of an elaborate application form. A farm engine manufacturer who maintains a small-town plant and trains his own workmen, drawn from the farming section about him, questions an applicant as to his willingness to learn the trade on small wages, to purchase a home, to begin on night shift and to support the benefit association

where the experience they have had in the actual work of manufacturing the product will enable them to surpass in efficiency those head workers who have not had this experience.

In employing a large force, of course, it is impossible to make

their fitness for head work an indispensable condition, but it will often pay very definitely to add to the factory force each year a certain percentage of workers who have this promise of increased value.

The best source from which to obtain men of this sort is from our schools and colleges. Each year there graduate from our grammar schools, high schools and colleges thousands of eager, ambitious, intelligent young men who are anxious to find places in the industrial world. Wide-awake concerns are watching these sources.

As soon as you are convinced that it pays to hire for advancement, begin to keep in close touch with the heads of the grammar schools and high schools of your city, and with the dean of some college or technical school. Let these men pick out for you each year a certain number of boys, whom, as a result of close observation and contact, they can recommend.

HOW TO DEVELOP BOYS TO FILL FUTURE EXECUTIVE VACANCIES

PLACE these boys in your shop, in your factory, in your warehouse, at the bottom of the ladder. Do not strive to tie them down with contracts and agreements, apprenticeship or otherwise. The employment relation is worth while and desirable only so long as it is mutually satisfactory. When lack of satisfaction is felt on either side, the relationship had better cease.

Many of these boys will fail, but some out of each batch will make good. These boys coming up through your business, each developing capacities along certain lines, will be a never-failing source to which you can look in filling more responsible places.

In ultimate effect this plan undoubtedly offers the best means of securing men for the development and improvement of an organization. But it is a plan which requires several years to get into effective working order. Fortunate indeed are those concerns whose executives have already been broad-minded and far-seeing enough to put into effect such a policy.

Those concerns which have not already adopted this policy should do so at once, and five years from now their problem of where to look for men will be no problem at all.

The concern, however, which needs men immediately and has developed no reserve supply among its own employees, must have more immediate sources. These sources vary with the kind of men who are required. While exceptions are frequent, the man out of employment who comes to you seeking a position does not usually offer the best available timber from which to

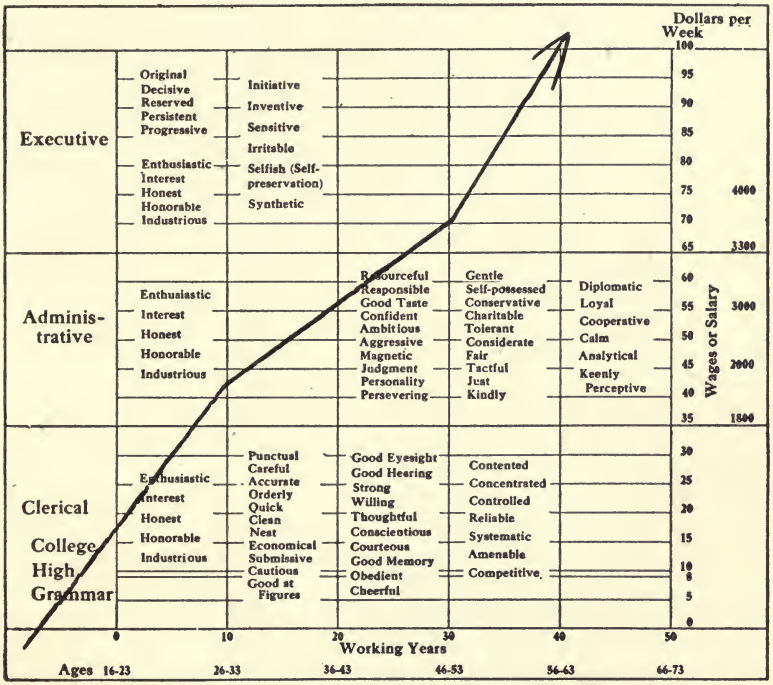


FIGURE IV: Here is suggested a method by which any employee can more accurately estimate his own qualifications in laying his course up through any concern. Age, education, natural qualities and developed traits determine advancement

recruit your organization. Really good men seldom are out of employment, usually retaining one connection until another one has been secured or offered to them.

In filling clerical positions, an effective plan is to consult the audit company which makes the annual audit of your business. The accountants of such a concern are generally in touch with many office workers and they usually are glad to recommend men who deserve advancement.

In employing technical men for factory work, advertisements in the technical papers generally reach the class of men you want to secure. If you require a factory foreman and have an attractive position to offer, an advertisement in some of the leading trade journals will usually bring in many applications from men who are making good but who are looking for greater opportunity. Practically every line of technical factory work affords journals which reach the leading men in the field.

The same principle holds good in securing highly trained technical workmen for definite branches of industry. Advertisements in the technical papers relating to these industries are generally read by ambitious workers in the trade. If the advertised position does not appeal to the reader personally, he will generally pass the word on to one of his fellows.

In employing unskilled workers the best results can seldom be obtained by running general "help wanted" advertisements. It is better to develop a file of possible employees through a careful record of applications received and by securing from men already employed names of friends who they think would make desirable workmen.

The ability to draw the best class of factory workers, both skilled and unskilled, depends almost wholly on working conditions. The most desirable class of workpeople, both men and women, demand that the conditions under which they work shall be as attractive as possible. The slovenly kept factory can never hope to attract the best workers, and as it must be contented with second-class help, its product will be second class.

I have found in many instances that it is good business to pay slightly more than the prevailing rate of wages in an industry in order that the pick of the workers in that industry may be secured.

Some years ago a new manager was employed to reorganize a cotton mill in one of the smaller New England towns. The manufacture was a high-grade line of cotton goods. Great difficulty had long been experienced in securing the right kind of help. The working conditions were good, but the wages paid were not enough to attract the better class of workers from the larger mill centers.

By increasing the piecework and day-work rates about ten

per cent, a complete change in the situation soon was brought about. Applications for work in this mill were obtained from the best workers in the larger towns and within a year the character of the force had been changed completely. The result was an increase in production which netted a material reduction in the cost of output.

Another experience along the same line occurred in connection with a large stamping plant in one of our larger middle-western cities some years ago.

Physical conditions were bad—very bad. The factory was dark, dirty and badly kept. Raw and finished stock and metal clippings were piled promiscuously around the aisles and in spaces between the machines. Lighting was poor and sanitary arrangements unspeakable.

As a result of these conditions, in order to keep a force of nine hundred at work, it was necessary to employ between four and five thousand people each year.

Our first work was the modernization of the factory. All raw material was collected in a stock-room from which it was issued only as needed. Finished stock was taken from the machines as soon as completed. Trimmings and waste were collected hourly. A force of men was employed whose duty it was to keep the factory clean. Liberal coats of white were used on the walls and ceilings. New lighting arrangements were installed throughout the entire plant. Modern plumbing and washrooms were provided. The factory, instead of being a horror for the worker, became as attractive as it is possible for such an industry to become.

As a result of these changes the number of employments necessary decreased from between four and five thousand to less than fifteen hundred. The production of the plant was increased about twenty-five per cent. Much more careful selection of employees became possible, and a class of labor which had never before been willing to work in the plant applied for employment.

III

PICKING THE BEST MAN FOR THE JOB

TO develop a labor supply is one thing. To select the best of that material is quite another. The choosing of human material is the most important function which an executive is called on to perform, and as it is the most important, it is also the most difficult. Material may be analyzed and tested, specifications drawn up and comparisons made; but labor can be fully tested only as it is tried out in actual practice.

Psychologists are trying hard to reduce human material to a definitely determinable basis. Employment experts who claim to be able to apply the tests of the laboratory in a practical commercial way have developed and have been employed in some concerns.

In certain lines of specialized work where a large number of employees are required, some encouraging results have been obtained through laboratory experimentation.

Prof. Hugo Münsterberg of Harvard has been particularly successful in picking out telephone operators and motormen by means of psychological tests. Certain definite qualifications for these two positions are required which can be determined by laboratory methods. In a series of tests involving several hundred applicants, ninety per cent of those chosen by the Münsterberg methods made good while only fifty per cent of those chosen in the ordinary way succeeded. Motormen chosen in the same way made good in similar proportions.

Dr. Katherine Blackford has worked out, as a result of a long series of observations, certain methods of judging a person's fitness for a particular class of work and of telling with approx-

imate accuracy whether an applicant will make good at this work or not. In spite of these promising developments, however, the science is still in its infancy, and cannot yet be said to fit the daily routine of ordinary commercial establishments.

Are there, then, any methods for choosing men which are practical for everyday business? Many executives believe there are. Methods followed by various successful employers always will vary, but certain general principles are common to all.

Employees should be judged as definitely as possible, according to their qualifications for the work which they are to do.

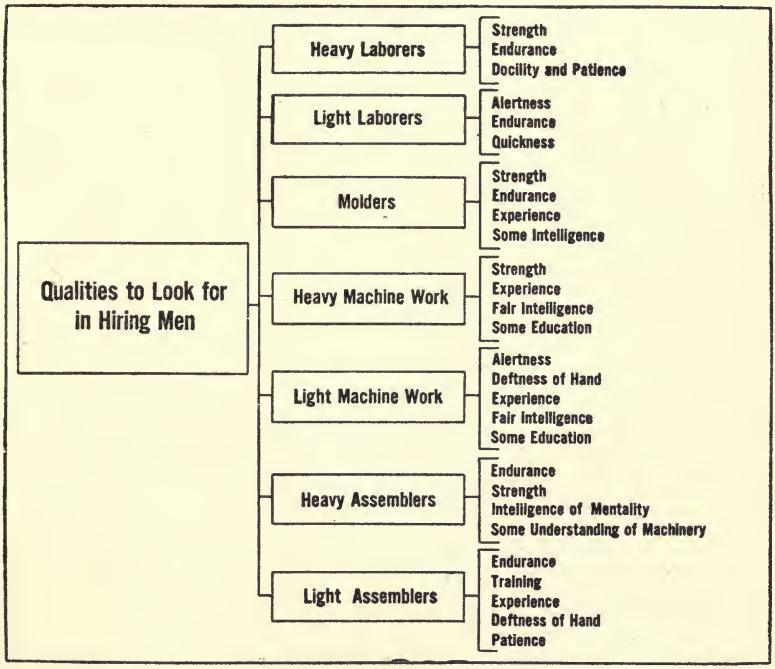


FIGURE V: Work has become so specialized that skilful employment managers have been able to "analyze the job" and lay down specifications for men who are to undertake different tasks. An elementary analysis of this sort is here shown

The man who would make a successful pig-iron handler might be too slow-witted for trucking duty, or the grinder of large tools, too heavy-handed for a watchmaker. As an initial step it is well to make a list of the various groups into which the

workers may be divided and then to list under each class those qualifications that are (1) necessary and (2) desirable.

Assume a typical plant manufacturing machine tools, and consider the various classes of workers who must be employed and the various qualifications which should be sought in each class. In such a plant, workers might well be classified as: heavy laborers, light laborers, molders, men for heavy machine work, men for light machine work, heavy assemblers, light assemblers, die and tool makers (Figure V).

Basic qualifications which all of these different classes of workers in this or any plant should possess are: cleanliness, reliability, sobriety, industry and good nature. There are definite ways for the man in charge of employment to determine who does and who does not possess these basic qualifications.

Consider cleanliness. Any man who fails to measure up on this score under inspection, no matter what his other qualifications are, should be rejected. He will, as a rule, be slovenly in his work, lazy, undesirable from every point of view.

"Is the applicant a man who can be depended upon?" is the next test. Will he stick to the job if he secures it? Is he a man who will lift or shift burdens? An investigation of his past record will usually decide. Detailed records of the applicant's past employment must be obtained from him, and sufficient time should elapse before he is accepted to allow inquiry into this record. Much can be determined in connection with this quality by consulting the merchants from whom the man buys his necessary supplies. Inquiry of his landlord or his boarding-house keeper, and an inspection of his home and family also will go far toward determining the man's reliability.

It may seem impractical and unnecessary to go to all this trouble in connection with a man who is going to be employed on a labor gang for a couple of dollars a day, but it is not. From the laboring gang and the men whom you are employing today will be chosen your advanced workers of tomorrow. No man should be employed simply on the basis of his ability to do just the work on hand. He is going to become, rather, a fixture in the organization, a permanent asset of the business. It is the recognition of this basic fact in employment that may make

APPLICATION for POSITION
(Continued)

What school have you completed?_____

What studies did you like best?_____

What least?_____

What kind of work do you like best?_____

What are you doing to improve yourself?_____

Remarks, re your experience, etc._____

Employment Dept.
The AMERICA METALWARE CO.

ANALYSIS of APPLICANT

Date_____ 191 __.

Name_____

Address_____

Age_____ Height_____ Weight_____

Temperament_____ Texture_____

Mark whether this applicant has (+) a high degree of,
(✓) a moderate amount of, or (—) a lack of the following:

Health_____	Dependable_____	Intelligent_____	Industrious_____
Persistent_____	Forceful_____	Neat_____	Accurate_____
Orderly_____	Careful_____	Punctual_____	Ambitious_____
Quick_____	Cheerful_____	Practical_____	Resourceful_____
Teachable_____	Strength_____	Educated_____	Adaptable_____

General appearance of body_____ of dress_____

Adapted to mental work_____ manual work_____

Adapted to indoor work_____ outdoor work_____

Has the applicant been successful in past?_____

Is there a good reason for changing?_____

Has applicant good knowledge of work to be done?_____

Is good judgment shown?_____ Are references satisfactory?_____

Does the applicant live at home?_____

Remarks_____

Recommendations_____

Efficiency_____ Analyzed_____

ANALYSIS of APPLICANT (Continued)

RECORD of EMPLOYEE

Date	Foreman	Dept.	Position Number	Kind of Work	Special Ability	Eff.	Total Pay	Remarks

FORMS II-IV: These forms are in successful use in a plant whose employment manager uses advanced methods of character analysis. At the top is shown the reverse of the application blank; the applicant's answers to these questions help to indicate his character. "On the Analysis of Applicant" the skilled employment man marks his own estimate. The "Record of Employee" on the reverse of the sheet keeps a close check upon the value of this analysis

the difference between a successful and an unsuccessful business.

Then take the question of sobriety. The workman who gets drunk on Saturday night is not fit to do his work on Monday. Production charts of many plants have shown a slump in output ranging from ten to thirty per cent on Monday, owing to the personal habits of the workmen. Furthermore, the man who spends his money on liquor is not able to maintain a satisfactory home, and to secure the peace of mind and the physical nourishment which are necessary for his maximum efficiency. It is in order, therefore, not to guess but to make a personal investigation of the man's life, by inquiry from the tradesmen with whom he deals, of his priest or minister if he is affiliated with a church, of the policeman covering the beat where he lives and of his neighbors, friends and associates.

Worker or shirker? is the next question. The man's industry must be determined principally by a study of his record with past employers if he has previously been employed, or, if he is seeking employment for the first time, by inquiries of his teachers and associates.

To get the best results from a plant, finally, a happy, good-natured spirit must prevail. A wise manager wants everyone in his organization to be happy. If some are not happy they cannot work well—they cannot do good work—they hinder one another—and the success of the business is threatened. If the employment man, while securing the information on which to base his inquiry into other qualities, will watch the eyes and lips of his man and note whether or not his conversation is hopeful and friendly, he can grade closely the applicant's good nature.

ONLY A THOROUGH INVESTIGATION OF RECORDS SIFTS OUT THE BEST APPLICANTS

THOUGH custom varies, it is often inadvisable to ask the applicant to fill out a blank. To fill out the application for him, asking him the necessary questions and noting his manner of replying gives a peculiar insight into his character. That none of these questions may be overlooked, they should all be listed on a suitable blank.

Apprentice training in the General Electric Company—both classroom theory and shop practice—is here shown. In the course each apprentice has practical work in both mechanical drawing and the laying out of the work itself after the drawing has been perfected

The study of mechanics (below) and the work of the first year apprentices in the General Electric molding course (above) are planned by skilled instructors and carried out under close supervision. Each apprentice is required to choose a definite trade and to work at it from one to two months in order to show his fitness for that trade before entering the courses

The applicant, having measured up successfully to all of these general questions, must now be considered from the point of view of his special qualifications for the work in immediate prospect.

The physical qualities which different classes of work (Figure V) demand can best be determined by a physical examination. An examination of this sort is demanded of applicants for the army and navy, for the police force, mail carriers and by many of the larger railroad companies. It may well be extended even to the smaller concerns, whose needs can be met at small expense by a local physician.

Other qualifications can be determined by the man in charge of employment, studying the face, hands, general appearance and speed of the candidate.

Investigation of the previous employment record usually discloses the training and experience. Entire reliance, however, should not be placed on references. A worker with an indifferent history or apparently too little experience may prove to be the best of "raw material." Then, too, the blame for a man failing to make good in a previous connection may be fully as much with his previous employer as with himself.

Operations differ so much from bench to bench, and factory to factory, that every employment chief needs to make his own tabulation of qualities. The analysis reproduced suggests how he may do this. To put off this preparation until men are urgently needed, however, often results in serious blunders. The same principles apply to the judgment of head workers, but deeper study is required, of both place and man. A definite list of required qualifications for each of the different kinds of work involved will guide the employer accurately in his investigation of the applicant.

The general qualifications of cleanliness, reliability, sobriety, industry and good nature apply just as forcibly to head workers as they do to hand workers, and should perhaps be even more strictly adhered to in picking out the executive staff.

Here again the few dollars spent in careful investigation of an applicant's record before employment is a wise investment, for nothing is more costly than the constant hiring and firing of office and executive help.

As far as possible in hiring men for headwork positions, their availability for higher positions later on should be considered.

Personality becomes a matter of great importance, particularly in employing the salesmen and higher executives who are to control the force or meet the trade. Many executives make it a rule to employ no one for such positions whose personality would not permit him to become a personal friend. Doubtless good men have been lost by applying this rule, but on the whole it has worked out admirably. Every organization is bound to reflect more or less the personality of the man at the head of it. If he is of the right kind, the more definite this reflection is, the more successful the business is likely to be. If employers insist on employing men whom they do not care to know personally, how can they hope that these men will create the right impression on lower employees or the people with whom they come in contact outside of the business?

It is a mighty good rule when employing a man for a position of any importance to take him home to dinner or to spend an evening with him at the club. In this way you will come in close personal contact with him and will easily determine whether or not he has a sympathetic personality and a good character.

The proper choice of human material is of the most vital character in the building up of a successful business. Definite determination of the qualifications required for each position and careful checking of the applicant against these desired qualifications goes far toward assuring successful choice.

Time and money spent in coming to know the abilities of the applicant is well spent and will be returned many times over in increased profits, if men are hired for development and promotion.

IV

STARTING MEN RIGHT

LINED up in a large room of the plant through which a manufacturer was recently ushering a visitor, were about seventy-five men and boys from sixty down to fourteen years of age. Each was waiting his turn to "have a try" at the men behind the desk, who hired the factory help.

"About one in ten of these greenies may be taken on, and of those who land a job, perhaps one in five will make good," said the manufacturer bluntly.

"How do you teach the new hands their work," he was asked.

"I haven't time to teach them," said he. "It's up to the man to make good or chase himself. We can't bother to *make* mechanics."

This manufacturer had spent more than $100,000 on his factory and machinery. He was not a crank on labor questions. The men in his employ who *did* make good were fairly treated. If any new mechanical appliance came out that spelled greater efficiency, he was among the first to adopt it. He failed, however, to realize that his most valuable asset walked away from him every day, and sometimes in pretty much dilapidated shoe leather.

Getting the right machines is no bigger task than getting and keeping the right men. In accomplishing this, much depends upon getting the man into a favorable attitude at the start, upon his learning the ropes, feeling at home and giving the business his loyalty. It is impossible, for instance, to keep men long who feel themselves to be strangers, looked upon with suspicion by the older hands and unfamiliar with their surroundings.

In one plant where the manager recognizes the importance of starting men right, the employment department furnishes each new worker with a little booklet that describes in an entertaining way the factory and its product. The booklet is so attractive that the man is likely not only to read it, but to keep it and refer to it.

Each new man, moreover, is taken through the factory by a clerk of the employment department, who introduces him to every foreman with whom he is likely to come in contact. His own foreman in turn takes him around and introduces him to the men in his department, and gradually explains the peculiarities of his work and surroundings.

The result is that the new man "feels at home" at once.

The manager of this plant was prompted to this procedure by the heavy quota of quits and new men, which kept his organization continually in a turmoil. After trailing several new men during their first days of work, he found that: "We show possible customers, visitors and even competitors through our plant; yet our own men do not know what they are doing or why they are doing it and are started in without any effort on our part to show them how."

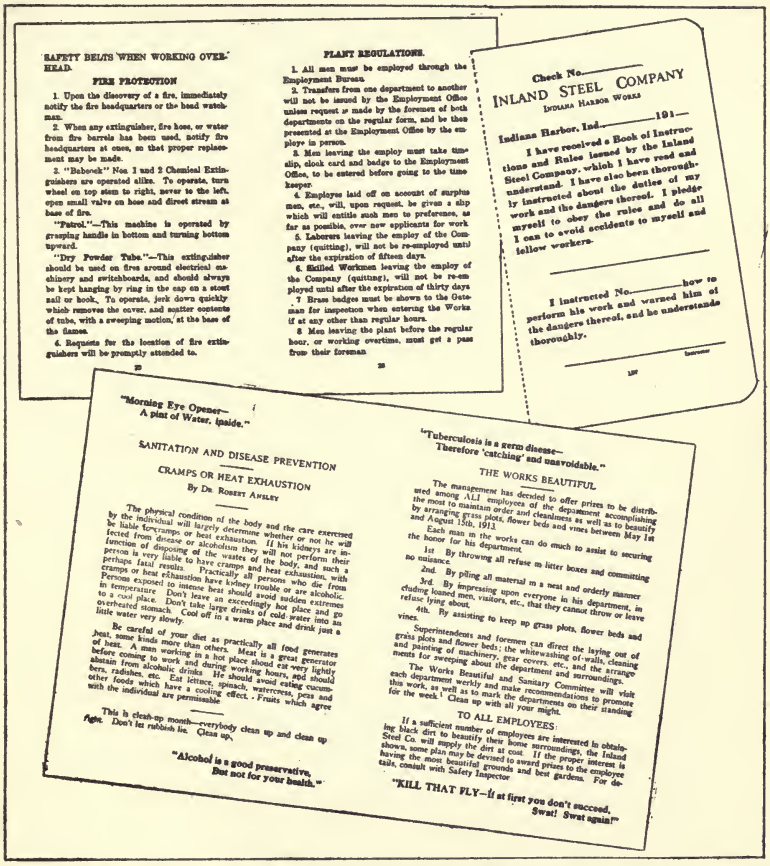
Since the plan of introducing the man to his place has been worked out, this factory has found that good men stay much longer and new men have to be broken in more rarely than before. An increase in output also is evident.

PLANS THAT HELP THE NEW EMPLOYEE TO GET DOWN TO WORK

LOCALISMS and factory customs often exist which the new man wishes and needs to know. The factory often has traditions or a distinct personality which will gain the good will and cooperation of the new men. To cover these points several concerns issue the employees' booklets in various languages, so as to reach all new employees (Figure VI).

Such a booklet usually gives starting and quitting time, fire drills, dates of payday and method of payment, sick benefit associations, profit-sharing conditions if such are in effect and list of officers. A short history of the company sometimes follows and perhaps a handy local map for the newcomer.

Another phase of the new man's introduction to his work is the personal or social side. In the small shop or department or gang the new employee wants to know those with whom he is to work. Many managers feel that a foreman can start a new



SAFETY BELTS WHEN WORKING OVER-HEAD.

FIRE PROTECTION

1. Upon the discovery of a fire, immediately notify the fire headquarters or the head watchman.
2. When any extinguisher, fire hose, or water from fire barrels has been used, notify fire headquarters at once, so that proper replacement may be made.
3. "Babcock" Non 1 and 2 Chemical Extinguishers are operated alike. To operate, turn wheel on top stem to right, never to the left, open small valve on hose and direct stream at base of fire.

"Patrol."—This machine is operated by grasping handle in bottom and turning bottom upward.

"Dry Powder Tube."—This extinguisher should be used on fires around electrical machinery and switchboards, and should always be kept hanging by ring in the cap on a stout nail or hook. To operate, jerk down quickly which removes the cover, and scatter contents of tube, with a sweeping motion, at the base of the flames.

4. Requests for the location of fire extinguishers will be promptly attended to.

PLANT REGULATIONS.

1. All men must be employed through the Employment Bureau.
2. Transfers from one department to another will not be issued by the Employment Office unless request is made by the foremen of both departments on the regular form, and be then presented at the Employment Office by the employe in person.
3. Men leaving the employ must take time-slip, clock card and badge to the Employment Office, to be entered before going to the time keeper.
4. Employes laid off on account of surplus men, etc., will, upon request, be given a slip which will entitle such men to preference, as far as possible, over new applicants for work.
5. Laborers leaving the employ of the Company (quitting), will not be re-employed until after the expiration of fifteen days.
6. Skilled Workmen leaving the employ of the Company (quitting), will not be re-employed until after the expiration of thirty days.
7. Brass badges must be shown to the Gateman for inspection when entering the Works if at any other than regular hours.
8. Men leaving the plant before the regular hour, or working overtime, must get a pass from their foreman.

Check No._____

INLAND STEEL COMPANY

INDIANA HARBOR WORKS

Indiana Harbor, Ind._____ 191_

I have received a Book of Instructions and Rules issued by the Inland Steel Company, which I have read and understand. I have also been thoroughly instructed about the duties of my work and the dangers thereof. I pledge myself to obey the rules and do all I can to avoid accidents to myself and fellow workers.

_____

I instructed No._____ how to perform his work and warned him of the dangers thereof, and he understands thoroughly.

_____

"Morning Eye Opener—
A pint of Water. Inside."

SANITATION AND DISEASE PREVENTION

CRAMPS OR HEAT EXHAUSTION

By Dr. Robert Ashley

The physical condition of the body and the care exercised by the individual will largely determine whether or not he will be liable to cramps or heat exhaustion. If his kidneys are affected from disease or alcoholism they will not perform their function of disposing of the wastes of the body, and such a person is very liable to have cramps and heat exhaustion, with perhaps fatal results. Practically all persons who die from cramps or heat exhaustion have kidney trouble or are alcoholic. Persons exposed to intense heat should avoid sudden extremes in temperature. Don't leave an exceedingly hot place and go to a cool place. Don't take large drinks of cold water into an overheated stomach. Cool off in a warm place and drink just a little water very slowly.

Be careful of your diet as practically all food generates heat, some kinds more than others. Meat is a great generator of heat. A man working in a hot place should eat very lightly before coming to work and during working hours, and should abstain from alcoholic drinks. He should avoid eating cucumbers, radishes, etc. Eat lettuce, spinach, watercress, peas and other foods which have a cooling effect. Fruits which agree with the individual are permissable.

This is clean-up month—everybody clean up and clean up Ages. Don't let rubbish lie. Clean up.

"Alcohol is a good preservative,
But not for your health."

"Tuberculosis is a germ disease—
Therefore 'catching' and unavoidable."

THE WORKS BEAUTIFUL

The management has decided to offer prizes to be distributed among ALL employees of the department accomplishing the most to maintain order and cleanliness as well as to beautify by arranging grass plots, flower beds and vines between May 1st and August 15th, 1913.

Each man in the works can do much to assist to securing the honor for his department.

1st By throwing all refuse in litter boxes and committing no nuisance.

2nd. By piling all material in a neat and orderly manner.

3rd. By impressing upon everyone in his department, including loaned men, visitors, etc., that they cannot throw or leave refuse lying about.

4th. By assisting to keep up grass plots, flower beds and vines.

Superintendents and foremen can direct the laying out of grass plots and flower beds; the whitewashing of walls, cleaning and painting of machinery, gear covers etc., and the arrangements for sweeping about the department and surroundings.

The Works Beautiful and Sanitary Committee will visit each department weekly and make recommendations to promote this work, as well as to mark the departments on their standing for the week. Clean up with all your might.

TO ALL EMPLOYEES:

If a sufficient number of employees are interested in obtaining black dirt to beautify their home surroundings, the Inland Steel Co. will supply the dirt at cost. If the proper interest is shown, some plan may be devised to award prizes to the employee having the most beautiful grounds and best gardens. For details, consult with Safety Inspector.

"KILL THAT FLY—If at first you don't succeed,
Swat! Swat again"

FIGURE VI: The three pages shown above are from the handbook given to new employees at the Inland Steel Company; the two below, at the Universal Portland Cement Company. Among the interesting points shown are the expert advice upon health, the attention drawn to everyday hygiene, the instruction in the plant regulations, "safety first," and fire protection. The page shown in heavy type illustrates the practice of requiring new workmen to read the warnings against accidents

man in no better way than to introduce him to his co-workers. Where an employees' organization exists special efforts are sometimes made periodically to give the new man a good send-off socially.

One firm when enlarging its plant in a locality where housing conditions made it almost impossible to hold the needed help, found it worth while even to start a file for the registration of rooms and houses for rent. Suitable forms were printed and supplied to real estate men and landlords with the request to fill them out and return them for record. The traffic department of the factory, at the same time, took over the routine work of handling freight and household effects for the newcomers. These methods enabled the out-of-town man to get down to work from the start and gave the concern an enviable reputation for attracting and holding men.

MANY MANUFACTURERS APPOINT REGULAR INSTRUCTORS TO TEACH NEW MEN

AFTER the routine of introducing a man has been settled, the greater problem still remains of his actual ability and duties. If he comes to you saying that he is a skilled employee, how are you to know that his honest interpretation of the word "skilled" parallels yours? Perhaps your product requires a greater degree of refinement in workmanship than he is used to. Perhaps your foreman assigns him a machine and some material, leaves him, comes three or four days later and determines from his pile of spoiled work how much or how little he can do? Does that pile show his capacity fairly?

"What system of instruction have you for your green hands other than pointers given by fellow workers?" This problem was recently put to two hundred manufacturers in many branches of industry. The replies cover a wide range of experience, running the gamut from frank admission of entire neglect of method in starting new men to a description of the highly developed specific instruction supplied under scientific management principles.

A Vermont manufacturer trusts the nearest machine operator to "tip off" the new man as to his duties. An Ohio manufacturer puts all green hands under the direct responsibility of the job foremen, who are in turn responsible to the foremen of the departments. By this method, the job foreman can devote more time to teaching each man.

The reply from a New York state manufacturer indicates that the problem of starting men has been considered logically according to the class of work:

"In one department where we employ men and where the work would be classed as skilled, the employees are divided into groups of about twenty-five. Each group is in charge of a sub-foreman responsible to a general foreman. The sub-foreman explains the operation and gives further instruction where necessary. A group of twenty-five will be principally experienced hands, with a few apprentices. The latter expect no direct instruction from fellow workmen, as this is all given by the foreman and sub-foreman.

"In another department where we employ girls, beginners are placed beside more experienced operators who are expected to give them instruction. This department is on piecework, but we have placed several of the most skilled operators on weekly wage and have made it their duty to instruct apprentices."

SCIENTIFIC MANAGEMENT APPLIED TO THE TRAINING OF NEW MEN

ANOTHER plan of training by sub-foremen is in successful operation at an eastern printing plant:

"We have no elaborately developed schools or apprentice system," says the manager. "The group system under the direction of a group boss is an apprentice system in itself, and the instruction for the performance of the work, originating from instruction cards which come from the planning room, must be right. The apprentice, therefore, following the instructions of his group boss and his card, is guided in the right path." This plant is operated on scientific management principles.

"Most of our people," says a Cleveland garment maker, "are what we term 'skilled.' Girls often come to us who tell us that they have done their own sewing or have worked for a dressmaker. This may be true or they may be good along some lines of sewing, yet not fitted for work such as we have in our factory.

"These girls are placed in our school for a period of two to four weeks. Here they learn to do things according to our ways

and are paid six dollars per week. These new employees are always young girls. The two weeks of schooling, we find, gives them a self-assurance which enables them to do much better work when they go into a large room among experienced hands."

In a Philadelphia plant where scientific management has been very thoroughly applied, new men receive this complete instruction, as the vice-president of the concern described it:

"Green hands started at work in our shops have the benefit of instruction from the various functional foremen. The gang boss instructs them in setting of work on their machines, seeing that their tools and work are brought to them in advance, and so on. The speed boss, who might more properly be termed the instructor in machine operation, teaches them in the handling of their machines, the use of cutting tools, and other matters pertaining to the operation of the machine itself, and in connection with the work being done while the machine is in operation. The inspector gives them instruction in all matters pertaining to the quality of the work.

"All of the instruction given by these functional foremen is the best known method, laid out by the planning department and covered by an instruction card which is made up on each operation to be performed on each part.

"We have no formal apprenticeship system, but we employ young men under instruction by the functional foremen, starting them on work of a simple character and gradually advancing them until they become all around workmen.

"We have a very definite method for measuring losses due to green hands, but the loss from this source is very small indeed, as the functional foremen give special attention to green hands and do everything possible to avoid this sort of loss. In the great majority of cases, spoilage of work by green hands is the fault of the management rather than the men."

In more than one plant, the rule has been adopted that no man will be promoted or transferred to new work until he has trained and broken in his successor. Besides training the new men, one plant puts all the advancing employees through a sort of service examination and incidentally brings to notice those who are especially gifted to teach. From prospects thus developed, instructors may be picked for a training system.

It is not always possible at the outset, even after considerable study, to see for what work a man is best fitted—to get him immediately started on the right road. Adapting men to jobs is quite likely to be a *process* rather than a matter of quick decision, though the latter is too often attempted and left as final.

The great mistake is not in misplacing, but in failing to shift later. Too often a man is put at the wrong work and then is forgotten or "fired." Hollis Godfrey in a discussion at the Tuck School conference on scientific management, in speaking from the scientific management viewpoint, said of the men whose first step has been unfortunate:

"If a workman does not succeed, we consider that it is up to us to show him how to succeed. Instead of blaming him we try first to see what is the matter with the management. If a workman cannot do the work in one job, we find another job for him, put him at that and educate him there. If a man has a job which needs strength in his hands, and he has not that, scientific management does not say 'throw him out'—it says, 'find the job he can do with the hands which he has; that is, fit the man to the work.'"

V

RECORDS THAT GAGE WORK AND WORTH

EMPLOYMENT records formerly consisted of an item to the bookkeeper when a new man was hired, time cards for his wages and another note or word to the accountant when he left. These records are still held sufficient in the average small shop where the personal acquaintance of the superintendent with his men roughly takes the place of records which indicate the value and possibilities of workers. But the failures of memory as matched against records have won over many small concerns to the new way. In the plant that handles thousands or even hundreds of men, the employment heads now absolutely require accounting methods on labor sources and "bad risks," akin to the purchasing agent's files on material sources and stores on hand.

Sources of labor supply make up one file. This sometimes consists of actual applications filled out by men looking for places and marked with the employment manager's preference, or a file of 3x5 or 5x8 cards will be maintained, on which the essentials of applications, recommendations and cases of workmen released because of illness or slack time, are briefly noted. When records of employees have been kept, the record card or envelope, including the "quit slip," is shifted or copied to this file, so that it is easy to identify the same applicant should he return, and to accept or reject him according to his record.

With the man actually at work, a number of records are needed to get (1) a careful estimate of the man when employed; (2) a running history of his work, indicating what he should be paid and where he will fit best as vacancies call for men. The

essential points may be taken care of on a few simple forms, or in the factory employing its thousands, may require complete records with manifolds for various departments (Figure VII).

Where a simple outline record only is required to refresh the

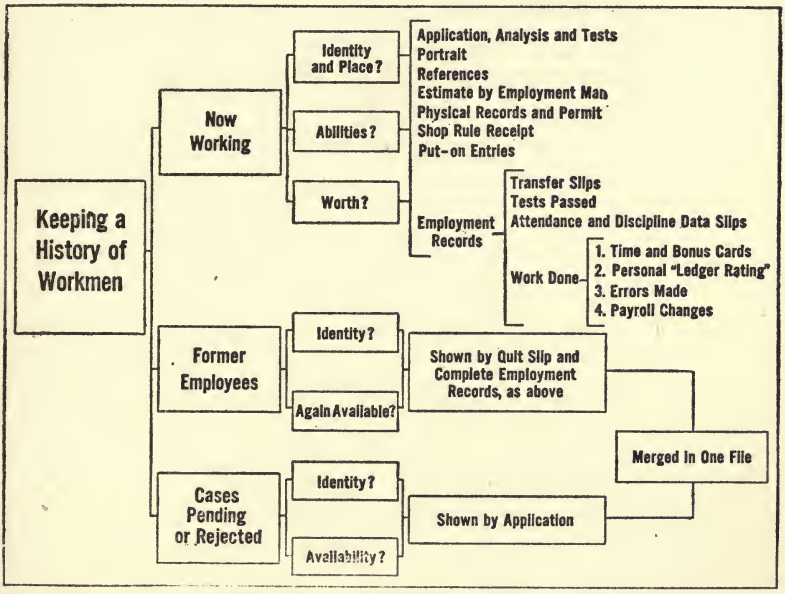


FIGURE VII: The essential points to know about applicants and employees and the basic forms covering these points are here listed. Any system is likely to run to red tape unless frequently checked against some such outline and brought back to the vital purposes. These points are very easily covered in a small plant, but require cross-reference conveniences in the large factory

memory of the management, this is carried on the front and back of a 3x5 card (Forms V and VI). This card record is supplemented by an applicant's book in which the best men are listed in order as they apply. When an employee leaves, his card is brought up to date under the heading of "Remarks," after which it is transferred to an "ex" file of workmen who are available for re-employment.

A FILING METHOD THAT FACILITATES THE HIRING OF THE RIGHT MEN

ALMOST every big industrial plant has worked out an employment system to meet its own needs. An engineering firm that has charge of the operation of some thirty buildings

in New York is constantly in need of men with special training. To supply this want, a labor source file is used, with alphabetical name cards on which the tabs are differently placed to indicate an engineer, a fireman, an elevator man or a porter.

When help is to be hired in a large city for work at a suburban plant forms are needed on which every foreman can requisition the needed workmen. With the following system, clerks keep an intelligent record of twelve thousand employees.

Each foreman is required to list (Form VII) the number of new workmen of each kind he needs in a given time. When he wants men, he sends the employment department an "Advice

Record

Entered Our Employ	6/25 . raise 8/5 . . . . .
Rate per Hour	23 . 26 . . . . .
Left Our Employ	9/27/12 Reason Illness
Remarks:	

Employment Report

Name	Rector, J. G. Dept. Cabinet
Address	736 Roosevelt Ave.
Date	6/25/12
Started Work at	8:00 o'clock, as, (class of work) Lidder
Rate per Hour	23 Clock No. 42
Approved	S. H. K. Sup't. R. S. Hillman Foreman

FORMS V and VI: Front and reverse of a 3x5 filing card, carrying the simplest type of an employment record. The front of the card is filled when a man starts work and his later history is recorded on the back. Ample space is left for remarks

of Workmen Required" (Form VIII). This card must bear the signature of the department and general foreman.

Applicants are first questioned as to the kind of work they can do and desire, and then divided by classes in another wait-

FIELD MACHINING DEPT. | SECTION A-L

OCCUPATION

BORING MILL (VERTICAL)	2
" " (HORIZONTAL)	4
" " (FLOOR)	3
PLANER	2
MILLING MACHINE	3
DRILL PRESS	4
FITTER (LAY OUT WORK)	
" ROUGH	2
MACHINIST HELPER	
LABORERS	5
ERRAND BOY	1

A. I. 14
P. H. Odell

NAME	OCCUPATION	SECTION	RATE

ADVICE OF WORKMEN REQUIRED

TO THE EMPLOYMENT CLERK DATE July 15 1914

WORKMEN AS FOLLOWS ARE REQUIRED IN SEC. A-4 Plant DEPT.

J. Henry — GEN. FOREMAN
J. Richards — FOREMAN

NUMBER	OCCUPATION	OLD RATE	NEW RATE	NEW OR REPLACING
	Rough Fitter		32¢	
P. H. Odell				

NAMES SUGGESTED

Record of Employment

NAME John Kenyon CHECK NO. 381
SEC. C DEPT. Tool
ADDRESS 325 Willow St
PLACE OF BIRTH Hartford, Conn. DATE OF BIRTH 1879
HAVE YOU WORKED FOR THIS CO. BEFORE? No DEPTS.
I HEREBY CERTIFY THAT THE ABOVE STATEMENTS ARE TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF
EMPLOYEE'S SIGNATURE John Kenyon
DATE 1-20-14 WITNESS E. L. Thomson
THIS SPACE FOR USE OF EMPLOYMENT DEPT.

Transfers

FROM DEPT.	TO DEPT.	DATE	NEW CHECK NO.
Tool	Machine	3-14-14	762

ADVICE OF EMPLOYEES QUIT OR DISCHARGED

January 27 1914
John Kenyon SEC. C CHECK NO. 381
ADDRESS 325 Willow St.
OCCUPATION Tool Maker
MARK OUT WORDS THAT DO NOT APPLY
QUIT WORK WITH NOTICE / ~~WITHOUT NOTICE~~ / ~~DISCHARGED~~
DATE January 26 1914
AT 5.30 ~~A. M.~~ P. M.
REASON Sick
W. S. Jones — FOREMAN
Wm Burns — GEN. FOREMAN
FORWARD THIS COPY TO EMPLOYMENT DEPT.

ADVICE OF TRANSFER OF WORKS EMPLOYEES

NAME P. H. Odell RELIEF DEPT. No. 26

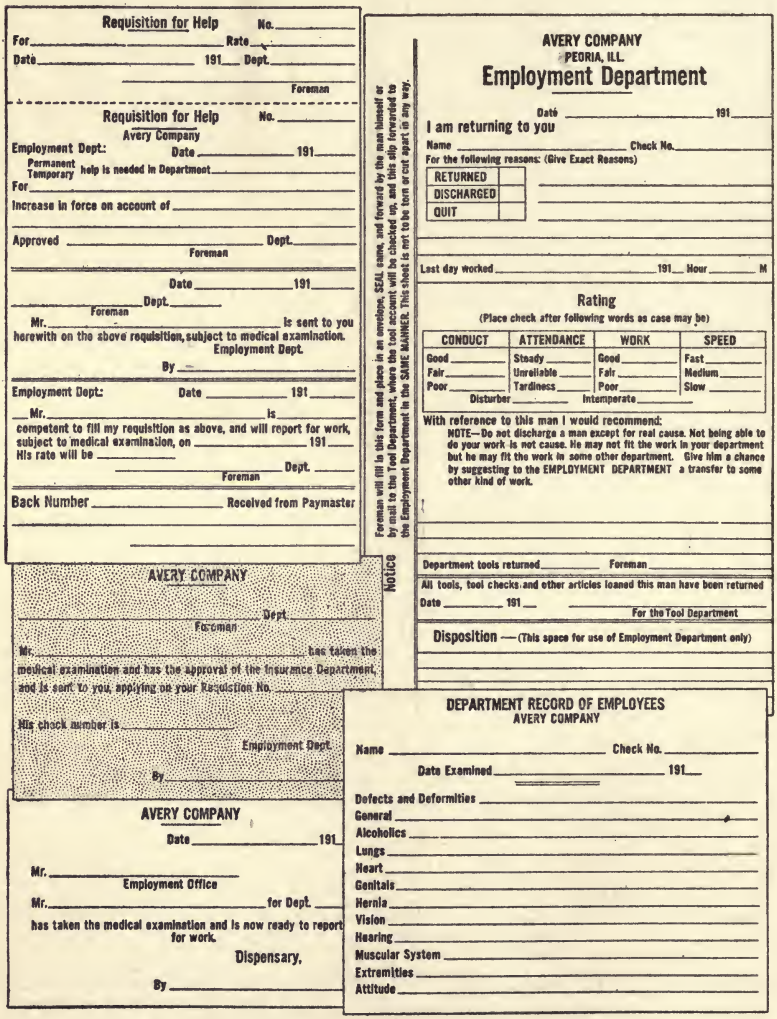
TRANSFERRED FROM		TRANSFERRED TO	
SEC. B	DEPT. Lathe	SEC. 3F	DEPT. Planer
CHECK NO. 243	RATE 30¢	CHECK NO. 137	RATE 32¢
OCCUPATION	CLASS	OCCUPATION	CLASS
FOREMAN Geo Baker		FOREMAN Jos. Richards	
GEN. FOREMAN H. W. Burke		GEN. FOREMAN John Henry	
TOOL ACCOUNT ADJUSTED F. R. Smith		GEN. FOREMAN SMALL TOOL DEPT.	
DATE OF TRANSFER July 7 1914		NOTED	RATE DEPT.

FOREMAN TO WHOM TRANSFER IS MADE MUST NOT ACCEPT THIS CARD UNTIL TOOL ACCOUNT HAS BEEN ADJUSTED

FORMS VII–XIV: Classification cards (upper left) are for each foreman to enumerate his normal labor requirements. The small slip is the workman's check number record. When the foreman needs a new man he uses the form shown (upper right); the under card is a "blotter" record of accepted applicants. A record of employment and transfers is kept on the two sides of one card (middle). A complete record of a transfer and also a "quit slip" are shown in the lower forms

ing room where an employment man has his desk. He interviews the applicants, picks his men and turns them over to an assistant at an adjoining desk, who lists them on a "blotter" record of accepted applicants (Form IX). They fill and sign their own record of employment cards (Form X). The assistant then gives them credentials and sends them to the employment department at the plant. Here the clerk makes out a small check card (Form XI) corresponding to the time check

the workman will carry and files it for identification. The employment card is then put in the active file. These two files identify any workman either by name or number.



Requisition for Help No. _____
For _____ Rate _____
Date _____ 191__ Dept. _____
Foreman

Requisition for Help No. _____
Avery Company
Employment Dept.: Date _____ 191__
Permanent / Temporary help is needed in Department
For _____
Increase in force on account of _____
Approved _____ Dept. _____
Foreman

Date _____ 191__
Dept. _____
Foreman
Mr. _____ is sent to you herewith on the above requisition, subject to medical examination.
Employment Dept.
By _____

Employment Dept.: Date _____ 191__
Mr. _____ is competent to fill my requisition as above, and will report for work, subject to medical examination, on _____ 191__
His rate will be _____
Dept. _____
Foreman

Back Number _____ Received from Paymaster

Foreman will fill in this form and place in an envelope, SEAL, name, and forward by the man himself or by mail to the Tool Department, where the tool account will be checked up, and this slip forwarded to the Employment Department in the SAME MANNER. This sheet is not to be torn or cut apart in any way.

Notice

AVERY COMPANY
PEORIA, ILL.
Employment Department

Date _____ 191__
I am returning to you
Name _____ Check No. _____
For the following reasons: (Give Exact Reasons)

RETURNED		
DISCHARGED		
QUIT		

Last day worked _____ 191__ Hour _____ M

Rating
(Place check after following words as case may be)

CONDUCT	ATTENDANCE	WORK	SPEED
Good	Steady	Good	Fast
Fair	Unreliable	Fair	Medium
Poor	Tardiness	Poor	Slow
	Disturber	Intemperate	

With reference to this man I would recommend:
NOTE—Do not discharge a man except for real cause. Not being able to do your work is not cause. He may not fit the work in your department but he may fit the work in some other department. Give him a chance by suggesting to the EMPLOYMENT DEPARTMENT a transfer to some other kind of work.

Department tools returned _____ Foreman _____
All tools, tool checks and other articles loaned this man have been returned
Date _____ 191__ _____
For the Tool Department

Disposition — (This space for use of Employment Department only)

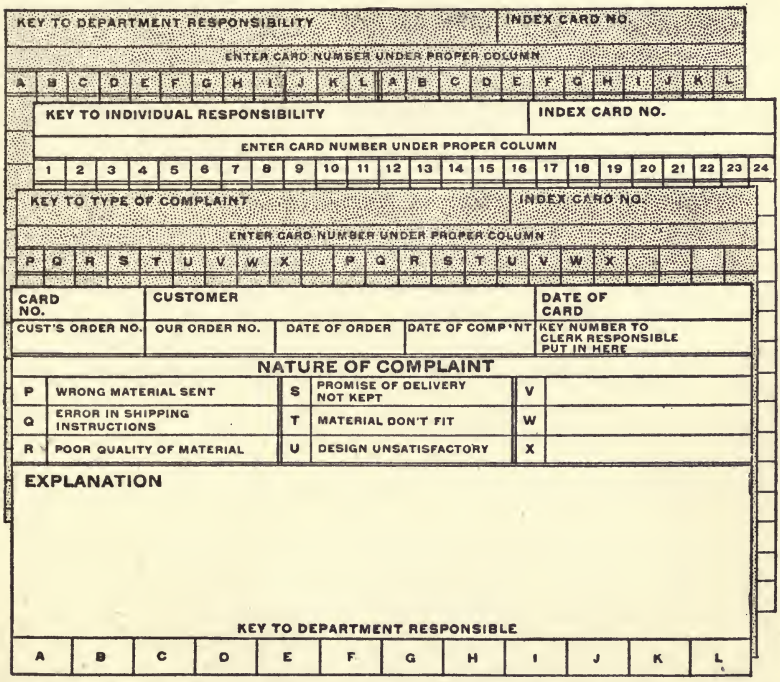
AVERY COMPANY
Dept. _____
Foreman
Mr. _____ has taken the medical examination and has the approval of the Insurance Department, and is sent to you, applying on your Requisition No. _____
His check number is _____
Employment Dept.
By _____

AVERY COMPANY
Date _____ 191__
Mr. _____
Employment Office
Mr. _____ for Dept. _____
has taken the medical examination and is now ready to report for work.
Dispensary,
By _____

DEPARTMENT RECORD OF EMPLOYEES
AVERY COMPANY
Name _____ Check No. _____
Date Examined _____ 191__
Defects and Deformities _____
General _____
Alcoholics _____
Lungs _____
Heart _____
Genitals _____
Hernia _____
Vision _____
Hearing _____
Muscular System _____
Extremities _____
Attitude _____

FORMS XV-XIX: Some of the more important employment forms used by the Avery Company are here shown. Beginning at the left, above, the forms cover the department requisition for help, and applicant's stub, the final record of a man who has left and turned in his tools, and below, three of the medical examination forms which must be filled out before a man is employed

When the employee quits, the foreman fills out a "quit slip" in triplicate (Form XII). One copy of this goes to the paymaster; one to the rate department, which keeps a record of every employee's rate and average premium earnings; and the third to the employment department. An employment clerk then removes the ex-employee's cards from both files and inserts


KEY TO DEPARTMENT RESPONSIBILITY | INDEX CARD NO.

ENTER CARD NUMBER UNDER PROPER COLUMN

A B C D E F G H I J K L A B C D E F G H I J K L

KEY TO INDIVIDUAL RESPONSIBILITY | INDEX CARD NO.

ENTER CARD NUMBER UNDER PROPER COLUMN

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

KEY TO TYPE OF COMPLAINT | INDEX CARD NO.

ENTER CARD NUMBER UNDER PROPER COLUMN

P Q R S T U V W X P Q R S T U V W X

CARD NO. | CUSTOMER | DATE OF CARD

CUST'S ORDER NO. | OUR ORDER NO. | DATE OF ORDER | DATE OF COMP'NT | KEY NUMBER TO CLERK RESPONSIBLE PUT IN HERE

NATURE OF COMPLAINT

P	WRONG MATERIAL SENT	S	PROMISE OF DELIVERY NOT KEPT	V	
Q	ERROR IN SHIPPING INSTRUCTIONS	T	MATERIAL DON'T FIT	W	
R	POOR QUALITY OF MATERIAL	U	DESIGN UNSATISFACTORY	X	

EXPLANATION

KEY TO DEPARTMENT RESPONSIBLE

A B C D E F G H I J K L

FORMS XX-XXIII: The top card shows the department responsible for a complaint. The second designates the individual at fault, and the one below it designates the nature of the complaint. The bottom card summarizes the information given on the other three

the record of employment in an inactive file. All applicants are checked against this file to secure the record of anyone offering himself for employment a second time.

With nearly twelve thousand people regularly employed and many thousands changing every year, this system has proved an easy and effective way to keep track of workmen. This plan, however, makes little effort to analyze the abilities of applicants and to gage their development or increasing value. In an-

other system, put to proof by a Buffalo metalware company, emphasis has successfully been laid on exactly these points.

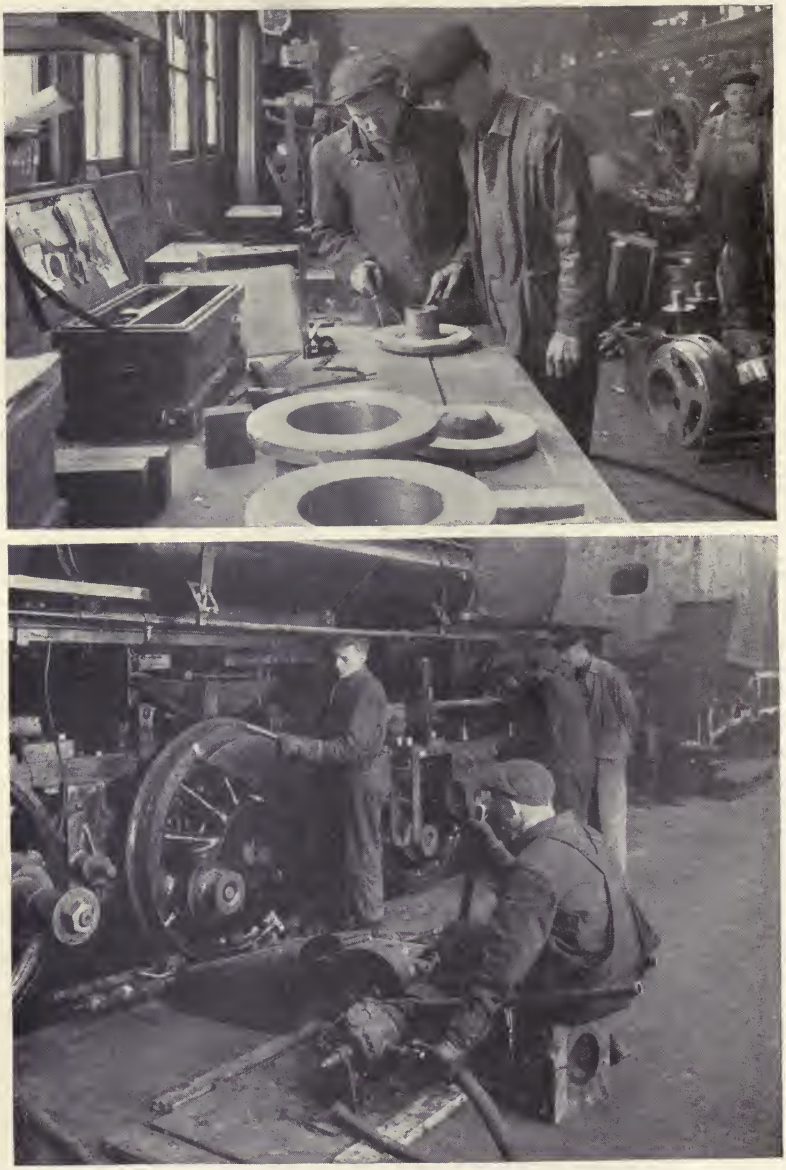
Applicants are first required to fill out or assist the employment clerk in filling out an 8x10 blank. An experienced employment man then engages the applicant in conversation and closely checks his characteristics and natural abilities on an analysis blank (Form III). The reverse of this blank (Form IV) becomes a record of the employee, showing how the employment manager judged and placed the new man, and his record thereafter.

In case an employee is shown by his production records to be either ineffective or deserving of promotion, his foreman so reports to the employment department. After going over his record and perhaps interviewing him again, the employment chief shifts him to fit. A further form used in this system is the recommendation for employment, which was furnished to the more valuable employees to enable them to find places for friends with similar abilities and good records.

A HIGHLY DEVELOPED EMPLOYMENT SYSTEM FOR THE BIG FACTORY

A STILL more elaborate employment system is used in concern manufacturing steel pipe. Both office and factory employees come under the plan. Hundreds of applicants in a day is not an unusual crowd to handle. For office employees, a seniority plan of promotion prevails and most new employees are boys. After filling out a simple blank, applicants are given test sheets carrying an hour's work in arithmetic. The factory application is more complete and includes a series of questions on physical condition. If a vacancy exists and the candidate appears eligible, he is sent to the studio in the general office building and his photograph is secured. Prints of this photograph are pasted in the upper right-hand corner of the letters sent to his references. The use of the photograph prevents the perpetration of any fraud in identity. In handling so large a body of men, instances have occurred where an applicant assumed the name of a workman who had a fine record with the same or a competing firm or, being a good mechanic, applied for some friend or rela-

The new way of initiating a man into the work is not to throw him on his own responsibility, but to place one or more new men in charge of a skilled workman to show them exactly what the working conditions and their duties are. Still more effective is the plan of written standard practice, explained by the "functional boss" under scientific management



In the Santa Fe Railway shops, the training of apprentices has been carried into many departments. The upper view shows the instructor assisting an apprentice to lay out his work and suggests the value of giving every new employee a sense of direction, which is becoming common practice in progressive plants

tive and sent a substitute to take the new job. The picture pasted on the various records makes identity certain.

If the references turn out well, an envelope 9x11½ is made out as a permanent employment record for the new man. A photograph is attached and its date noted. The employee is placed, given a number and rate, and his various applications

OPERATION REPORT

ORDER NO. 50221 DEPARTMENT Machine PIECE NO. 40

Workman's No. 29 Name Johnson Oper. No. 1 Machine Size and Style 1¼ T

Workman's No. _____ Name _____ Oper. No. _____ Date 5/10/13

HOUR STARTED	Name of Operation		Name of Operation	
	1	Bore and Ream hole	4	
	2		5	
	3		6	

	Operation No. 1		Operation No. 2		Operation No. 3		Operation No. 4		Operation No. 5		Operation No. 6	
ESTIMATE TIME EACH	15 Min.		Min.		Min.		Min.		Min.		Min.	
Report No.	No. Pieces Finished	Actual Time Each	No. Pieces Finished	Actual Time Each	No. Pieces Finished	Actual Time Each	No. Pieces Finished	Actual Time Each	No. Pieces Finished	Actual Time Each	No. Pieces Finished	Actual Time Each
1	5	21										
2	12	17½										
3	19	17½										
4	26	17⅓										
5	34	16+										
6	42	16										
7	50	16⅕										
8												
COMPLETE OPERATION	50	16⅕										
REMARKS	Estimate O. K. ✓		Operator Slow		Foreman's Inattention		Improper Tools		No. Jigs			

Name _____ Department _____

Began _____

Month	Record	Fines	Total Percentage

FORMS XXIV and XXV: The larger form enables the workman to check himself against the estimated time on each operation, to know his own record. At the bottom, the instructor can check any causes of delay. The small form shows a simple method of arriving at a percentage of efficiency for each employee, based upon reports of his record and fines made necessary by his failures

and references are assembled in the envelope, which goes to an alphabetical file. On the envelope is printed a sort of cipher code which makes it possible to keep a man's record for years with almost no clerical labor. Certain letters indicate failures, while others serve to record the man's steady development. This envelope is transferred to an ex-employees' file when the workman leaves. Change cards, quit slips and change-of-address cards are sent by the foreman to the employment department on occasion. Any employee who is taking leave receives a final time ticket which requires him to be interviewed by the employ-

ment manager before receiving his pay. This rule was adopted to prevent good men from getting away on account of fancied grievances or department jealousies. After such an interview, the employment man notes the history of the case on the final time sheet and inserts it in the record envelope.

A card index of all employees is also maintained. On the tab is the working number. These are arranged serially, each division in each department having its own set. Whenever a change is made on any number, lines are drawn through the previous name on the card. One red line indicates transfer to another department; two red lines a lay-off because of slackness; one black line quit; two black lines discharge for cause. These cards give a constant perspective on working conditions in any section of the plant.

FINDING AND RECORDING THE WORK FOR WHICH THE APPLICANT IS PHYSICALLY FIT

NO expert attempt is indicated in this system to find and record the physical condition of applicants. On this phase of employment system the practice of the National Cash Register plant and the Avery Company are suggestive. On the enactment of a new employers' liability act the Avery Company determined to secure a physical record of every man on the payroll and to maintain this record by demanding thereafter the estimate of the company's physician on all applicants before allowing them to go to work.

A month before the law went into effect, the company engaged two physicians and equipped an up-to-date dispensary. Sixty days later, 1,942 men had had physical examination, or treatment for injury or illness.

Judged as a labor efficiency measure, the result was, in the words of Secretary Avery, "a better moral tone throughout the works. The men seem to realize that they are a picked body of men and show it in their bearing. Attendance at the plant is steady, there is less coming and going, output has gone up without corresponding increases in the number of men, the quality has improved. In every way, conditions have shown a turn for the better.

"The applicant for a position, on his return to the employment office after being accepted by the department foreman, is taken in hand by the chief of the employment department and formally interviewed. First the two go over the shop rules. These are printed on the left-hand side of the front cover of a manila folder (Figure VI), which, if the man becomes an employee, constitutes a container for all information relating to

HART-PARR CO. LABOR RECORD SHEET For

Workman S W. Wood Dept. Machine Shop

Order No.	Week	Mch. No.	Oper. No.	Total Made	Lost or Spoiled Work	Total Time	Wage Rate	Std Cost	Job Cost	Loss for Spoiled Work	Total Net Loss	Total Net Gain
12-99	1-17	190	1	1		5 00	.24	24	1 20		96	
640	1-29	38	1	7		23 00	.24	5 04	5 52		1 44	
4025	1-30	38	1	11½		21 30	.24	4 27	5 16		2 33	
640	2-3	38	1	18¼		30 00	.24	8 82	7 20		71	
4025	2-5	38	1	12½		20 00	.24	4 75	4 80		76	
											28	
											04	
												4 10
												6 92
												6 00
												6 93
												8 70
												8 91
												9 61
												8 36
												7 13
												5 62
												4 53
												3 81
												2 57
												2 54
												3 03
												3 09
												27

INDIVIDUAL EFFICIENCY

Workman S.B. Hall Dept. Machine Operation Reaming Key No. B 261

From 1-5-14 To Remarks Total Hours Aver. Efficiency

Hours	Per Cent	Hours X Per Cent	Reference	Hours	Per Cent	Hours X Per Cent	Reference	Hours	Per Cent	Hours X Per Cent	Reference	Hours	Per Cent	Hours X Per Cent	Reference
50	90	450	98												

FORMS XXVI and XXVII: The larger card shows a record by which a company arrives at the value of the workman as compared with the standard cost established for the work he does. As he ceased to be a loss and returned the gain shown in the last column, his hourly rate was increased so as to approximate the standard cost. The smaller form is used to carry forward a record of a man's individual efficiency; the "reference" is to the ledger page carrying the detailed entries

him. If the applicant is willing to abide by the rules, he attaches his signature at the bottom. On the right-hand side of the cover is printed a form for taking the man's past record. This the interviewer fills out.

"During the examination many defects may be observed which bar a man from employment, such as mental attitude, faulty vision, complete illiteracy, alcoholism, venereal disease. This record the applicant also verifies by signing, and underneath the two signatures a witness must sign. All this has a marked

effect in impressing a man with the seriousness of his going to work in the shops of the Avery Company.

"The applicant is next sent to a second waiting room adjacent to the dispensary. Here he strips to the waist and first is examined by assistants as to vision, height, weight, measurements, past injuries and sicknesses, and has his urine tested. A physician then takes the applicant in hand and completes the more technical details. A record is taken on the inside of the manila folder, which in the meantime has been forwarded from the employment department and serves to notify the attendant of the applicant's presence (Forms XV-XIX).

"The medical department also assists the employment department in transfers and the return of workers to their tasks after absence due to sickness or injury."

RECORDS THAT SHOW THE VALUE OF EMPLOYEES THROUGHOUT THEIR TERM OF SERVICE

HOW to rate employees according to their efficiency so that payment will be fair and promotions correct is perhaps the most important of all the problems of employment records. One large concern opens a ledger account with the new employee in any position and credits him with a "level" rating of one hundred per cent. At the end of each month of service considered satisfactory by the foreman and superintendent in conference, two per cent is added to his credit. If, however, he proves incompetent in some detail or earns demerits, a fine of from two to five per cent goes on the debit side at the close of the month. Promotion usually falls to the men with the highest percentages. The upkeep of the system requires only an hour's work for one clerk.

In the training school maintained at a Vermont machine shop, every workman is taught his job and is so graded that the management have detailed records of his ability. Tabulation of responsibility for complaints gives another measure of employees. Upon receipt of any complaint from a customer due to goods shipped wrong, poorly packed, defective or otherwise unsatisfactory, a clerk enters the item on an index card. Routine errors

and complaints have been classified and to each group an index letter has been given, such as:

A—Goods shipped to wrong address.

B—Error in material shipped.

C—Goods defective in material.

This cipher letter is entered after the customer's name on the card. Key numbers are also used to indicate the person and department at fault after investigation has placed responsibility. The card is given a serial number and another card bearing the same number is sent to the department apparently responsible, with a request for an explanation. When the report is returned, the key numbers are copied on three tabulation cards (Forms XX-XXIII), one classified by type of error, one by departments at fault and the third by individuals. The plan was first tried in the office, then extended to include records of material spoiled and costly mistakes made in the shop. As important errors are not frequent, the system is not expensive to maintain.

HOW A MACHINE SHOP AND AN IMPLEMENT PLANT KEEP EXACT RECORDS OF WORKMEN'S PRODUCTIVENESS

THE recognized method of securing regular reports on the efficiency of workmen is to standardize the time or cost of a definite operation or machine part and to compare therewith the actual time or cost per operation or per piece shown by the workmen's time tickets.

In the Gisholt plant, each operation is numbered and assigned an estimated time. Someone then times the workman repeatedly and reports the number of pieces finished and the actual time for each (Forms XXIV-XXV). If the time is slow, the checker notes a criticism, as: "operation slow," "foreman's inattention," "improper tools."

A system which keeps a running record of every workman's production is that in use by the Hart-Parr Company. From the time records, a labor record sheet (Form XXVI) is posted for each workman. In the instance shown, the workman started at twenty-four cents and fell below his standard for seven weeks. He then struck his gait and earned increases from twenty-four to twenty-six cents and then finally twenty-seven cents per hour.

At the last rate his total net gain gradually fell off until he was running very close to standard. This condition indicates that his pay is right and that he must increase his efficiency before he secures another advance.

In another plant, similar results are posted on an individual efficiency card (Form XXVII) 5x8 inches in size. This card gives space for eighteen months' record by weeks. By adding the hours multiplied by per cent figures, a "batting average" is obtained which takes account of staying power and attendance. From this card the per cent efficiency is periodically carried to a rate-adjustment record which enables the superintendent to match pay closely to individual efficiency.

Part II

TEACHING MEN TO DO BETTER WORK

AUTHORITIES AND SOURCES FOR PART II

Chapter VI. Melville W. Mix, President, Dodge Manufacturing Company, contributes this chapter.

Chapter VII. By Mr. Porter; based upon his own experience and that of several other engineers and plants.

Chapter VIII. Edward Meyers of the Cutler-Hammer Company here presents the results of his personal experience in the hiring, handling and training of boys.

Chapter IX. This chapter gives in the main the advanced methods used for training women operatives at the Joseph & Feiss plant. Contributed by Mr. Porter after a personal investigation.

Chapter X. A collaboration by H. M. Wilcox, formerly of Miller, Franklin & Company, W. S. Ball and the staff editors, presenting methods of motion study among textile and garment factories, machine shops, etc.

VI

THE WAY TO WORK WITH MEN

SELECTING men—training men—furnishing them the incentive of pay elastic to effort—are important elements but not the whole of man-handling. There are further traits of human nature that every manager or foreman must consider if he is to increase output and reduce cost.

Ole Olson had worked hard and efficiently all winter in the lumber camps of Minnesota. He had saved up two hundred dollars, and went to Duluth to enjoy it. It didn't make any difference to Ole how much of it was premium money, earned by being more skilful or by exceeding the camp standard in certain operations. His real reward was to be a good time in Duluth; for hadn't he worked hard, and wasn't he entitled to a little pleasure?

Within a week, thanks to kind friends (?) of both sexes, Ole was "broke"; whereupon he stretched himself and soliloquized: "Oh, well; come easy, go easy. I tank I go back to work again."

Ole's state of mind was fairly indicative of that of a goodly percentage of men who work under a hard, monotonous drive; wonderfully efficient at work, and equally so at spending the proceeds thereof, seeking a relaxation that is absent from their occupation, and for which their very souls hunger. Disgracefully wasteful, surely, but we must understand the mental condition that originates in the monotony of certain kinds of work. It is not a question of maximum man-power—some attention must be paid to the spiritual reward; and in so far as that hunger may be partly satisfied during one's occupation, the excessive waste of reaction may be reduced by indulging certain relaxation in all

operations instead of denying all current mental rewards or desire for them during occupation.

Insufficient attention is being paid to the human side in this mad rush for the so-called efficiency. Man shall no longer be regarded as a machine. There are too many opportunities open to the red-blooded man of this day to necessitate his accepting employment which is open to him only on that basis. We all know of many instances where men are continuing in positions for less money than they are offered, or than may be obtained elsewhere, because of the satisfactory conditions and consideration they enjoy, which is sufficient to prove that money is not necessarily a competitor with occupational good will.

Much antagonism has been created against efficiency because of the false interpretation which has been placed upon the plan by many who have only seen the hard, driving side of the question. Men are likely to get the idea that they are being "speeded up" only to enhance the profit of the employer, and thus may be aroused within them the spirit of resentment which can but defeat the very purpose of the science.

Efficiency, in fact, is "speeding down" but making the motions count for something. It should save labor and physical as well as mental strain. Fewer motions and more results is the keynote. Sometimes it is the person, sometimes the machine or the operation that is changed.

The mind must be cultivated in advance of the body, and ample opportunity must be given for a full understanding of the meaning and advantage of operative standards and rewards to the end that all workers, from top to bottom, will feel the same moral responsibility to meet standard conditions in occupations that a merchant should feel in giving sixteen ounces to the pound or thirty-six inches to the yard.

Operative standards are not established in a day; they have to deal with every controllable act of our lives, whether it be for hire or for our own service, and necessarily run afoul of our habits and whims, as well as of the unwritten laws of many crafts.

No efficiency work was ever successful that did not earn for itself the approval and satisfaction of the worker; or in other words, his spiritual cooperation. We don't work well under

any system if we have the strain of machine methods in our minds; yet in our very capacities as executives we may be endeavoring to press that yoke on those under our supervision, without a thought that the same sentiments and feelings which control our disposition to work also exist in the minds of those associated with us.

If you have worked for a man or firm that did not give you the cheer and comfort of a certain comradeship, the chances are you quit the job and found a more congenial atmosphere; and under that influence the best which was in you came out, and you "delivered the goods" that you could have delivered to your former employer if he had known how to encourage you.

All effort, to be effective and gratifying, must be collaborative. One need not be sentimental in this matter. We often find men who are apparently successful, who say there is no sentiment in business, yet there is no greater asset to any business than occupational good will. It is never seen in a financial statement and would probably be blue-penciled if it were stated and appraised, because of its intangibility. Nevertheless, it is one of the most important factors in developing a successful business.

The ancient and honorable game of golf is probably the original "efficiency" game; and whether you are a scratch man or one of those G. A. R. players who go out in sixty-one and back in sixty-five, you get an equal amount of pleasure out of the game, and that is because of the "standard" score, which is established for every course regardless of dissimilarity. Our handicaps may be expressed in percentages of efficiency, just as well as in the way they are expressed—the meaning is the same.

VII

SHOWING UNSKILLED LABOR HOW

CHEAP labor, like cheap material, is often the most expensive in the end. "The $7.00-a-week roustabout," said a factory manager sagely, "is the highest priced man in the shop."

When asked to explain this paradox, he went on: "Because he is the least controllable unit in the organization. He does as little as he can, and that in the most awkward manner. To get results with him requires an amount of supervision entirely out of proportion to the value of his labor. Considering his relative ineffectiveness, the high cost of supervision and the other overhead expense incidental to his work, you will find that he is costing you actually more in dollars and cents than a nominally higher priced man."

Even at its normal wage, however, higher grade labor will not condescend to compete at the heavy manual tasks which the unskilled man performs. The wage level for the man of muscle is, therefore, the lowest. From his point of view, as well as that of his employer, a paradox obtains, in that "the hardest labor brings the smallest return." Somehow, for the good of both sides, these paradoxes must be modified, if not reversed. From the standpoint of the man, less hard work must bring more adequate returns if he is to be loyal and advance. From the management's viewpoint, the high cost of cheap labor must come down.

Offhand, a seemingly impossible problem has been stated. The solution is simple, however. Cheap labor, unlike cheap material, is not as a rule fixed in quality—its low value is due rather

to its undevelopment. For the progressive employer, it is raw material; while some laborers are incapable of making any advance, the majority both are anxious and have capacity to improve, and a few have brilliant executive possibilities. The advancement of unskilled labor to the point where it earns more and costs less is a matter of training. Experience has shown that there is a right way of doing all things—a right way of shoveling, a right way of carrying pig-iron, a right way of pushing a broom. When this right way is found and put into practice, the result is an enormous increase in accomplishment with actually less expenditure of energy than under the old haphazard, do-as-you-please way. The management then can pay more because the men do more, and they can do more because they waste less.

Moreover, with each degree's increase in effectiveness, there is an added pleasure in the mere doing. This is greatest when steady activity, except for proper intervals of rest, is maintained in the correct form for a reasonable number of hours daily, and in return a compensation is given which stimulates the right intensity of interest. With efficiency thus comes happiness; and the happy worker who is expert, even though at a simple, primitive task, cannot help being a valuable asset to any organization. More than this, he has been primed for further progress of perhaps unexpected importance.

METHODS FOR TEACHING UNSKILLED LABOR HOW TO IMPROVE WORK

IN order to show common or unskilled labor how to do better work, these steps are necessary: first, the best way of doing a given operation must be ascertained; second, the proper frequency and length of rest periods must be established; third, the total hours of work must be adjusted so that complete recuperation ensues over night; fourth, definite tasks must be set which have a distinct relation to the compensation given; and fifth, the wage for satisfactory performance must be sufficiently in advance of the amount ordinarily paid to enlist the complete cooperation of the workers (Figure VIII).

The tasks set should be proper for a reasonably good man.

Then those who are of the proper calibre for this kind of work will quickly make good, and those who are not fitted for it will speedily demonstrate the fact. The latter should be sorted out as soon as their inaptitude is fully apparent, and more suitable work found for them. To allow them to stay on manifestly would be wrong; for in the end many would drop out discouraged, and in the meantime the attainment of the standard by those capable of it would be imperiled. Men of fairly even capacity in the same line must be brought together if they are effectively to pace one another. In athletics a good miler would be a poor person to select to push a dash-man to his best performance, and conversely. The same is true in the shop.

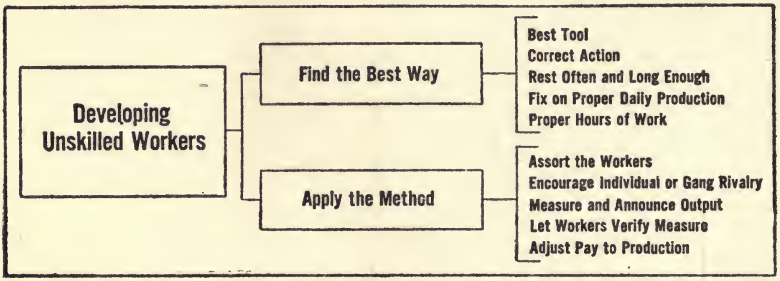


FIGURE VIII: These ten vital points in the development of greater output by unskilled workers represent the methods used by a foreman who increased the output per dollar 450 per cent

This applies to gang labor. And men naturally are stimulated to do their best when pitted against one another in putting forth exactly the same character of effort. When working individually, with the element of competition lacking, the standards of performance evidently cannot be set so high. But even then a man may be induced to compete against himself and thus in time be urged to a comparatively high standard. In all cases when it is practicable, however, the work of men in gangs should be individualized. That is to say, each man should clearly see his task, and his earnings in no way should be dependent upon the efforts of any other man. Experience shows that whenever a worker is forced to divide his compensation with one or more fellows, unless they are precisely even in capacity, the output falls and dissatisfaction permeates the group.

The first big problem is to determine the one best way. This

may be established by observation and study or by experiment. Usually some one workman will be found who has the native bent for doing things right. The smoothness and ease with which he works will be the indicator, and his output as compared to the rest the proof. If his motions do not seem to be fully efficient, a little coaching will make them so.

The observer may be his own subject. One of the most successful instructors of men at ordinary labor was a young college engineer who was as proficient with his muscle as with his brain. This man solved the quickest way of doing a number of different kinds of manual work by actually doing them himself. Having found the best way he would then teach it to his men. And because he spoke from practical experience his efforts were attended by extraordinary results. If the work requires the use of a mechanical aid—a pick, a shovel, a crowbar, or an axe—the ascertaining of the best way includes also the determining of the proper tool.

INCREASING OUTPUT BY STANDARDIZING INTERVALS FOR REST

WHEN the correct way has been established, the next step is to standardize the rest periods. Workmen, if left to their own devices, will take either too long or too short rests, depending on the incentive they have to endeavor. If the incentive is sharp, and there are no retarding influences, the tendency is to work too hard; on the other hand, if incentive is totally lacking, the tendency is to slow down to the point where fatigue actually is induced by the mere effort of holding back. That this is the result almost everyone can verify by analyzing his experience as a walker. There is always a gait best suited to a particular man, which he naturally assumes when he is his normal self and is walking with an object. This he can maintain indefinitely almost without weariness. Only occasionally does he feel the need of pausing for a few moments, to refresh himself. Quicken the gait, however slightly, and he soon begins to puff and blow and tire; slacken it, and he presently begins to show exhaustion from sheer inertia. So it is with every kind of muscular activity.

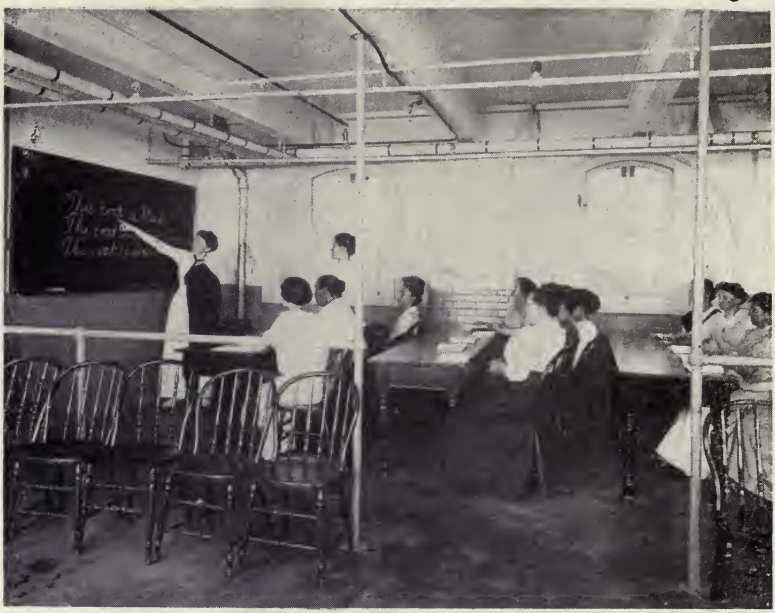
By experimenting, the proper frequency and length of rest periods for any kind of work readily can be ascertained. For instance, in the case of shovelers it has been found that best results come when the men are allowed or compelled to rest one minute every twelfth shovelful thrown. This is between five and ten per cent of the time. But in cases it may be necessary to allow as much as fifty per cent for resting, depending on the muscular effort required to go through one cycle of operations. An allowance of five to ten per cent also is necessary for unavoidable delays. As regards the intervals for rest, the men should be carefully advised and watched until the new habit of work is thoroughly fixed.

It is now possible to determine standards of performance that are practicable. Stop-watch observation is the basis. The work should be split into its elements, each timed separately and all timed together. In this way the points of loss will be disclosed and steps can be taken to eliminate those that obviously are pure waste. Eventually the quickest time will be apparent and this, corrected by the proper allowance for rest and for unavoidable delays, constitutes the standard. From this the proper output for a given period readily follows. In the course of these determinations the best length of working day also will be disclosed. If the hours are too long it will be shown by slowing down toward the end of day and by a lack of spontaneity on starting in the morning.

Finally, it remains to fix the compensation so that a good man will exert his best to achieve the standard. The precise per cent of advance over the current wage for this kind of labor is a matter for separate determination in each instance. So small an increase as ten per cent may produce the desired result; but experience shows that the proper stimulus is not supplied until the advance is at least twenty-five to thirty per cent, and in cases fifty to one hundred per cent increase may be required before satisfactory results appear.

The form of compensation is immaterial, so long as there is preserved a definite relation between output and wages. Day work frequently will answer every requirement if the hourly rates are contingent strictly on the standard of output being maintained. Piecework with the same stipulation also is satis-

The cut-and-try method in shop work is being displaced by the study-and-standardize plan. To set a cutting tool by guess required the above actions, and caused the workman to stoop and lift his own weight three times. When the adjustment was standardized, five simple, easy motions sufficed. Study of many operations has resulted in similar improvements



With the entrance of women into industry, the conditions of work have improved. At the National Cash Register plant at Dayton (below), equipment for women contributes towards comfort and efficiency. Teaching work and English is combined into one attention-holding operation in the Joseph & Feiss plant (above)

factory, and if there is a tendency to lapse from the standard usually the discharging occasionally of a man for failing to make high pay is sufficient to keep the gang keyed up; or it may be counteracted by a scheme of premium awards in addition, based on a comparison of the actual with the possible earnings. Day work with an arbitrary increase of twenty-five or fifty per cent when the standard is reached is still another arrangement which has yielded excellent results. This is the plan devised by H. L. Gantt and called by him "task-with-a-bonus" (Figure XII on page 119).

HOW TO KEEP UNSKILLED LABOR SATISFIED WITH WORK AND PAY

AN important point in this connection is to keep the men advised of their showing as often as possible. Before beginning another day's work, at least, they should be informed as to their output and earnings the previous day. Unskilled labor is like the small boy who runs an errand or performs a chore. He expects his five or ten cents honorarium, and whatever praise or censure goes with it, just as soon as the task is done. If these are deferred he loses interest and the next time is reluctant in his response.

It is furthermore essential that the system of measuring output carry with it ample assurance of accuracy and fairness. It must be one easily understood by a laborer of average intelligence and whenever possible it should permit of his verifying the figures. These conditions are not easy to fulfil. For common labor, in addition to being unskilled, to a large extent is foreign-born and non-English speaking, and usually illiterate even in its native tongue. Hence the ordinary means of conveying intelligence are unsuited. In one instance a color scheme served the purpose. Each man on coming in found in his box a slip of paper: a yellow slip indicated attainment of the standard; a white one failure. In addition the actual figures were given so that those who were able to grasp these could note their exact performance and earnings while the details were still fresh in their minds.

In this connection the value is seen of teaching English to

foreign-speaking labor. As they learn the language they are more easily dealt with, and when they have progressed to the point where they can read and write as well and are able to make out simple reports they are likely to be ready for a higher grade of work.

On change of address notices placarded by the Ford Motor Company in eight languages, this final slogan is maintained in its eight versions as a spur to the intelligence of the workmen: *Learn to read and write English.*

VIII

TEACHING BOYS TO BE ABLE WORKMEN

"WELL, my boy, what brought you up here?"

"My feet."

"Then let them take you down again in a hurry."

That's a typical instance of freshness in the average irresponsible boy. When you ask him a civil question he is ready with some sharp retort.

Boys are naturally independent. There is usually no absolute necessity for their working and they feel that they can go from one place to another or take a vacation whenever they like. The installation of automatic machines in so many factories makes it easy for the lad to get a job. High-priced men can be let go when a boy is hired as tender for the automatic machinery.

But boys are the men of tomorrow. It pays to study them. It takes years of experience to develop the right judgment in dealing with boys. Since no two are alike, each must be analyzed separately. Of course I look for general characteristics in the beginning. Most of them may be classed as energetic or lazy, truthful or dishonest, dextrous or awkward, shy or fresh. However, there are a great many more who have been allowed to form lax habits, but who may be entirely changed by careful training. The slow, lazy appearing lad may only have been assigned some disagreeable task in which he could take no interest. Dishonesty of others is often to blame for a boy's false statements. Working in an uncomfortable position puts another at a disadvantage and makes him appear awkward.

I am always in need of good employees and never lose the opportunity to hire the ones who look promising. A sign is

always kept hanging at the entrance, so that anyone earnestly searching for work may not pass by. When the young fellow enters the doorway I mentally take his measure. By the time he gets over to the desk I have formed an opinion of him. The way he walks, carries his hands and looks around all give clews to some characteristic; the little things he does unconsciously best portray his hidden traits. As he steps to the desk I begin a rapid cross-examination that gives him no opportunity to deliberate over answers. I ask where he worked before, how long, how much pay he received, why he quit, and so on.

A boy who had been working in a shipping room for five dollars a week came into the office one day. It took him fully five minutes to walk across the floor. When I spoke about piecework, he said he would try it. I told him we didn't do things on trial; if he began, it would be with the understanding that he would continue indefinitely. As soon as he finds that he has to speed up on a machine in order to make the money, he will get tired of the job.

If a boy isn't square he can do more harm than his wages are worth a dozen times over. Not long ago I discharged a lad who has been working on induction coils. He turned out an enormous amount of work, but when some one tested out one spool it was found that he had paid no attention to instructions. On most of the coils one end had been lost inside and it was necessary to tear them all apart in order to get both ends of the wire clear.

Laziness is easier to analyze than honesty. One of the applicants at our office had been making eighty cents a day at piecework, turning seams in a tinshop. After quitting he loafed for two weeks. His very appearance indicated laziness and lack of skill. His hands were stuck deep in his pockets and even his clothes hung in a devil-may-care fashion. If he had been given work, next day he would have wanted to go back to the other place to draw back pay or leave with some trivial excuse and then he wouldn't have shown up again.

Inquisitiveness is another bad fault. While I was talking to a workman one day a nearby boy kept working at my end of the bench. He was too inquisitive, too anxious to overhear something. I never let a boy get into the habit of looking

up this way. When you catch a fellow's eye more than once turned toward your desk, call him over and ask him what he wants. Give him to understand that his work doesn't depend on you. He can begin and work just as regularly each day, no matter what time you may get to the desk.

FINDING THE BOY'S POINT OF VIEW AS A MEANS OF CONTROL

WHEN you have hired a boy you have just begun. He must be put where he can work most efficiently and he must be trained very carefully in the beginning. It is when you begin directing their efforts that you appreciate the distinction between the quick, apt, bright-eyed lad, with supple muscles, and the slow, dull, awkward boy who starts work with a sullen expression and lack of energy.

It is up to you to keep them interested. You must take the boy's point of view, get into his confidence and study the situation as he has been forced to see it. Eliminate the factors which he believes keep him down. Personal interest and encouragement often hold a boy when everything else fails. If he wants to leave or some of his friends have decided to quit, manage to get the facts and talk over with all concerned their reasons for leaving, the advantages they hope to get at the next place, and so on. If the reason is a petty grievance, you can find a remedy, and if a boy leaves, and finds the new place is not what it was represented to him, he will invariably come back.

Boys' parents seldom understand them. Especially is this true in money matters. It seems that the average parent expects the boy to turn over all but twenty-five cents or so of his money each week. When he gets a raise here, he still gets twenty-five cents a week at home. Lots of times lack of interest can be traced to this reason. Boys say: "What's the use of killing myself turning out an extra thousand pieces this week when I don't get anything at home for it?"

This fact was brought forcibly to my attention some time ago, when a slot-machine vender in the city traced a lot of washers to one of our departments. Some of the boys had no spare money left when the parents had extracted the usual toll. They

liked gum and found they could use metal slugs instead of nickels in order to get an occasional "chew." It wasn't so much the boys' fault as that of the parents.

Boys are always an interesting problem, but you have to keep after them all the time. You have to keep close to the boy, put yourself in his place and reason out his petty troubles. See that he gets encouragement when he needs it; see that he gets the right treatment from his fellows. Sometimes one is shy, or nervous, or quick-tempered; each must be taken individually. What you might say to this one would have an entirely opposite effect on the other. Tact is the word that wins.

WAGE INCREASES AND SHOP DISCIPLINE FOR APPRENTICES

BOYS can do more work than men. A good, healthy lad is naturally enthusiastic. His muscles are supple, and his superfluous energy is expended as in recreation if he is interested in the work. If the work is sufficiently varied and not too hard he is developing in just the right way. The boy takes pride in the proper development of skill and muscle, because he realizes his capacity for such development. The man who has reached middle age and works from necessity is an entirely different proposition; the reaction has set in and makes him appear lazy.

Like men, no two boys are worth exactly the same pay. Each has individual traits or knacks that put him in a separate class, so far as his earning power is concerned. Some little fellow may do a great deal more than an older boy at the next machine. His services are worth more; he is capable of much greater skill in his regular development. Try to encourage such boys. Raise their pay gradually. Talk with each boy when you give him a raise. Never allow the boys to talk over wages with each other. No one is benefited by this exchange of confidences.

When a boy comes around and asks for a raise, he will often give the excuse: "Well, you gave John a raise." I tell him to go back and keep on working until he can come to me and say that he honestly believes he himself is worth more; not because John has been doing good work. Sometimes a clever bluffer

comes around with the latter excuse, really based on the first reason. If he has not proved that he is honestly improving in his work he does not get any satisfaction.

Gradual increases in pay, you will find, keep boys contented. Two raises of twenty-five cents a week during the first six months are a great deal better than one fifty-cent increase in pay. Have a small advancement and make it come oftener when such encouragement is needed.

No back talk can be tolerated where discipline is to be maintained among boys. The lad who shows too much independence in the beginning will never get down to real work like the one who feels that he still has much to learn.

The worst thing for discipline in a shop is the hard-luck story teller. He manages to make every fellow disgusted with work, want more pay and develop independent airs. He gets an intense satisfaction out of watching boys walk out. It usually happens that the trouble-maker is a good worker and one that a shop can ill afford to lose. But you simply can't keep up an organized force with him around. He tries to get the others around him to work in cliques, in order to have them waste time and pollute their minds with knocks about the plant.

It is a hard thing to fire a young fellow under such circumstances because I like to have every fellow who leaves bear no ill will against the company. Most of the boys who quit on some pretext or other will come back and want their old jobs again. I always pick out the work they like and this is a big factor in keeping the boy in love with his work.

The young man who is my assistant foreman has been with the company fifteen years. The boys winding resistances have been here eight to ten years. Of course, there are transients who never could be satisfied, but the average boy appreciates personal interest and encouragement, and is willing to stick by us when we give him a square deal. I tell them as nearly as possible what they can do so that no misunderstandings will arise later.

I make an opportunity for the deserving boy and work with him in making the most of his time to develop his ability and initiative. And these young men who realize what we have done for them are becoming the foundation of this company.

They are appreciative and continue to develop along the line marked for them in the beginning, and when developed they become the most valuable of employees.

The training which develops an employee into an expert will tend to restrict his efforts to the scope of the job, branch of the trade or business in which he works. He is narrowed both mentally and physically. While it is true that habits of work up to a certain point make one more quickly efficient in some allied work or trade, unless the chance is given before the employee's mind and habits become "set," he will become highly skilled in one thing and of little efficiency at anything else.

Training which extends over different branches more closely holds the attention, develops greater interest in the work and is less tiresome. It produces better muscles, more knowledge, sounder health and hands that can turn to any task. It fits a man to step into any vacancy in the shop and make good, perhaps not to the same extent as the "specialist," but still to do average work.

An excellent illustration of this point is the manner in which foremen are made in a certain large shop. If a young man is observed who seems to have the earmarks of executive ability he is started at one of the simplest tasks in the shop. He is kept at that particular task until he knows all about it, and is then put at the next task. From job to job he makes the round of the shop. Upon completing this course he is started just where he first began and kept on each task until he can do a full day's work at it. The complete instruction takes about two years. At the end of that time he is fitted to become an under-foreman. He is an "all around" employee and can fill any average workman's place. As a foreman he not only knows the work, but he can do it, or any part of it.

IX

TRAINING WOMEN OPERATIVES

SYSTEMATIC training of workers, with the advent of women into industry, received a great impulse in the direction of definite plans and methods. Of the average man, practicability is expected, from knocking about the home in his boyhood days. Special training for him, therefore, upon entering the fields of organized industry does not even yet seem essential. Few girls, however, are required to do the work about the home which fits them for factory tasks. True, for certain kinds of work they naturally are better qualified, and, as a class, tend to learn more rapidly than boys. Nevertheless, as a new factory hand, the average girl, until specially trained and disciplined, is not worth a minimum hire.

So it is in industries where large numbers of women are occupied that methods of training and developing employees are found furthest advanced. Initial hesitation past, encouraging results have followed and definite training plans have developed, not only for women, but also for men.

At the Joseph & Feiss plant the management has come to view the problem of training as apart from any sex distinction, as being rather an individual matter.

Nevertheless, most factory managers will recall detail peculiarities of the women workers' character, disregard of which has more than once precipitated trouble in the shop. Success with women operatives depends on familiarity with these traits and a training policy built about them. No doubt, women present the same basic human traits as men. Many superficial points of difference, however, exist. Women, for example, seem

more self-centered than men, and therefore have to be treated with greater tact and gentleness. An apparent slight or breach of courtesy, which a man quickly would forget, if he noticed, a woman is likely to cherish for days. To get results calls for care, and often an indirect suggestion brings results where a peremptory order fails.

Girls and women also instinctively crave neat and attractive surroundings. Good sanitation, plenty of light and air, pleasing decorations, a touch of the home atmosphere wherever possible —work wonders in retaining and inspiring women workers.

The so-called superior intuition of the feminine also is held by some managers to be a factor. Greater demands thus are made upon the manager for caution and astute dealing, in order to avoid misunderstandings.

Another point in favor of women is that, from any given level of society, the women noticeably are easier to teach and acquire a higher degree of skill than their brothers. In a money sense this is of prime importance, and is a leading reason why women so generally are preferred in classes of industries to which the work fits them. To get the same quality of service from men would necessitate the payment of higher wages than is warranted by the profits of the industry.

AROUSING AMBITION AND LOYALTY AMONG THE WOMEN WORKERS

ON the debit side of the page are the restricted ambition and lesser dependability of women as a class. Money and the rewards it will buy deeply attract women, however. Any plan for developing feminine efficiency therefore is well linked with the payroll. Offered a direct incentive, women as a rule learn easily and quickly. At the Joseph & Feiss factory, as much as fifty per cent increase in efficiency of girls has resulted through inducing the parents to allow their daughters to retain for personal use a certain margin of their wages, which they save in the "Clothcraft Penny Bank." Half the girls were found to be giving over all their earnings to the parents. This circumstance cuts off these workers from all personal reward and incentive in the carefully planned piece rates under which they

worked. The parents in most cases readily sanctioned the savings account and the girl at once found a new interest in her work (Forms XXVIII and XXIX).

NAME Doer, Jane

	No. 2353	No. 1443	No.
	Date 3-26-14	Date 4-9-14	Date
	9 Rate	10 Rate	11 Rate
	Sleeves sewed in		
	Time 94 $27.91	Time	Time
Mon.	Mar. 17	31 Apr.	14
Tues.	18	1	15
Wed.	19	2	16
Thur.	20	3	17
Fri.	21	4	18
Sat.	22	5	19

PAYROLL ALLOWANCE VOUCHER No. 1252 Dept. 12

To the Payroll Clerk:
Date 1-23-1915 Period 9
Name Mary Jones
Former operation edge stitching
Rate .26
Present operation top pkt. & welt stitching Rate .26
Nature of allowance
R
A
E
L
N ✓ new work
C
D
Entered
Checked

DATE	ANNOTATIONS	ITEMS	EXT.
Mon.		.723	.723
Tues.		.7045	1.4275
Wed.		.6735	2.10
Thur.		.6185	2.7185
Fri.		.58	3.2985
Sat.		.28	3.5785
Mon.		.571	4.1495
Tues.		.532	4.6815
Wed.		.4935	5.175
Thur.		.413	5.588
Fri.		.3965	5.9845
Sat.		.232	6.2165
			6.22

Recommended
Approved

Out.
Total
Paid

Date	Charge and Cash Items	Debit	Credit	Date	C

FORMS XXVIII and XXIX: On the payroll ledger of the Joseph & Feiss Company every two-weeks' pay period is numbered, as 9, 10, 11. Jane Doer's earnings for March 17 were $27.91. The earnings for each day are carried into the totals in the accumulative column. The number of hours worked are also noted. The payroll allowance voucher is used to avoid a loss in wages due to the worker's inexperience when changing from an old to a new operation

Girls who enter industry look forward quite generally to matrimony or at least take the traditional view that it is impossible

for women to get far in business. This feeling reacts upon their efficiency, and makes them largely indifferent to the appeals which move men so powerfully—promotion and permanence in employment.

The greater unreliability of woman labor which the experience of some manufacturers indicates has not been of moment, however, at the Joseph & Feiss plant. It is not that the ratio of marriages is lower, but that many who marry continue to work and not infrequently the wife returns presently to seek her former position, sometimes because the husband does not earn enough for two, more often through her longing to be back again in the familiar atmosphere of the shop.

When a new girl is needed, one or more applicants recommended by present employees are notified to report for a personal interview with the head of the service department. This department is responsible for employment as well as for the instruction and discipline, health and comfort of the operatives. Questioning reveals the girl's attitude towards work and her general fitness for the organization. The service head explains the requirements and conditions of engagement in detail, emphasizes the factors that make for the fullest cooperation and best results, and indicates the debilitating effect of dissipation and of doing outside work besides that which is naturally expected of every girl who lives at home. To be regular at work, to dress simply and to undergo medical, dental and ocular examination as deemed advisable are some of the other conditions.

During the process of introducing the worker to her new conditions, an instructor is assigned, whose business it now is to have the green hand trained in the correct method of work and impressed with the proper standards of quality. Instruction in the operation itself is based upon scientific determination of the one best way by motion and time studies and by actual tryout. The instructor keeps close tab on each case until the new girl unaided can earn the minimum wage. His reports meanwhile guide the service department in interviews which develop the employee's attitude toward her work. Fair dealing and encouragement, free from any appearance of discrimination, play an important part in winning the worker's confidence.

The payroll department also gages the new operative by her

earning capacity and keeps the service department informed of her progress. Periodically, all three departments report her progress in the various essentials to the general manager, so that he may help to solve any difficult case.

HOW WOMEN OPERATIVES DETERMINE THEIR OWN ADVANCEMENT

PRACTICALLY all work is on a piece basis, but beginners are guaranteed a minimum wage for a limited period. As earning capacity increases, the guarantee is first halved, then quartered and finally withdrawn altogether. That is, for a short period new operatives are paid on a day basis. Then, as soon as they are ready to work on a piece basis, but still unable to attain the standard, they are allowed half, and later, one-fourth of their day rate in addition to their piece earnings. Finally, when the worker is able to "go it" unaided, the guarantee ceases. Earnings then depend solely on her own initiative, except that no operative ever can earn less than the minimum if she falls below the standard through a cause beyond her control.

The gentle though insistent stimulus of this scheme of payment is apparent. It is nicely calculated to afford the maximum of encouragement without at the same time nursing negative qualities. A permanent guarantee would tend to keep the worker dependent upon it and thus jeopardize the attainment of the highest efficiency. A few weeks under this instruction and wage ordinarily give the new hand a high degree of skill. The plan applies to men as well as to women.

Part of the labor supply is foreign born or of foreign parentage and non-English speaking. The speedy acquirement of facility in English is made a condition of acceptance and advancement for such employees. The service department will furnish the required instruction or it may be obtained through one of the classes which are maintained at the factory by the Cleveland Board of Education. Learning under this arrangement is rapid, and it is not uncommon to see a foreign-tongued girl transformed, in the space of six months or a year, into a fine specimen of American womanhood, speaking and writing the English language with almost native fluency.

To aid advancement, a learner's or apprentice's course also is maintained. Anyone may become a candidate for this course, but only those who seem fitted and actuated by the proper motives are accepted. Upon starting, the student is transferred to a special department under the jurisdiction of the instruction department. He is taught to perform all the main operations in the shop, so that he fully understands the making of a garment. The workings of the indirect departments are also made plain to him.

Old hands who slump or who wish a change of work are handled precisely the same as are beginners, except that the follow-up by the service department is omitted. Indeed, they are encouraged to avail themselves of the help of the instruction department whenever they feel that they are not doing themselves full justice.

Graduates of the apprenticeship course are eligible to the higher positions in the organization. They may apply for any position they feel qualified to fill, and so far as practicable every aspirant for a high station is soon given a thorough tryout. As this is the only avenue to advancement—including clerical positions in the office and foremanships—opportunity is equal and those at the bottom have genuine incentives to work up. Advanced positions are open equally to men and women, and both are found filling important trusts.

For some positions women are superior to men, and for others the reverse is true. For the pressing of garments, as an instance, the choice practically is limited to men. But on light classes of work, requiring manual skill and dexterity, women as a rule are more efficient.

Upon the judgment of a manager in these matters of aptitude, thorough training and logical placing, his initial success in employing women and girls is likely to hinge. In planning incentives for his force, he must again remember the feminine viewpoint. If he would give his women workers a greater impulse to develop ability, he must make sure that they profit personally when their pay goes up, and that some of the higher places in the business are open to competent women.

X

DEVELOPING SKILL THROUGH MOTION STUDY

MOTION study is not a cure-all for any sort of industrial ill. But its proper and judicious use, coupled with carefully planned training for the individual workman, can effect many and great economies in almost any plant.

When any process requires the repetition of the same motion cycle over and over, millions of times in a year, a scientific and exhaustive study of the unit motions, the sequence of motions and the rearrangement of the work to reduce effort and time to a minimum will almost invariably effect large economies in labor.

A knitting mill of moderate size will make, say, one thousand dozen pair of hose per day, twenty-four thousand pieces of work. Each piece will require perhaps ten hand operations. Each operation may require, say, ten motions.

A bit of arithmetic shows, then, that the hand operations on this volume of produced material will require something like 720,000,000 motions per year.

Here, then, is a fruitful field for the motion-study man. Let us assume, for example, that by the elimination of some motions, and the reduction in time of others, an average of one one-hundredth of a minute can be saved on every motion. This will amount to 7,200,000 operator minutes, or 120,000 operator hours in a year. At ten cents per hour as the rate of wages, this is equivalent to $12,000. As the plant investment required for a hosiery mill will approximate one hundred dollars for every dozen of daily output, the saving in the above instance will represent twelve per cent on the amount invested in plant.

In these days of narrow margins in the manufacture of staples, this may, indeed, represent the difference between a loss and a profit, between a failure and a success.

On the other hand, although it is true that for every operation there may be a certain arrangement of work and sequence of motions by which a job can be executed with a minimum of effort at a maximum of speed, unless an operation is to be repeated in the same manner many, many times, the time and cost necessary to determine this one best method will generally be greater than the saving that can be effected.

The difference between motion and time study, and their relation to each other are important points to define. The former is qualitative; the latter quantitative. Motion study is a means to effect economies; time study to measure them.

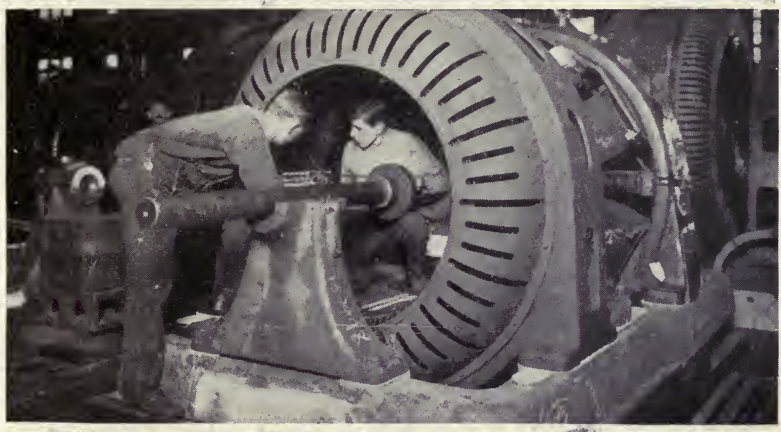
In approaching a new problem, the first step is to make a time study of the motions already employed by the workman or group of workmen engaged in performing this task.

Steps in Motion Study	Establishing Piece Price from Time Study
1. Make time study of motions as at present	1. Allow 10 per cent for rest and personal needs, or 6 min. per hour
2. From the time study, ascertain proportion of idle time and amount of productive to non-productive motions	2. Standard time per piece found to be 6 min.
3. If gang operation, determine amount of idle time of each man in each complete cycle of motions	3. Then productive time per hour equals 54 minutes
4. Determine present motions that are unnecessary	4. And number per hour that should be produced equals nine (9)
5. Study each motion separately and its relations to the preceding and succeeding motion, to determine the easiest and quickest manner in which each may be performed	5. Suppose hourly rate of workman 27 cents
6. Group motions into unit operations	6. Allow 33⅓% increase over present rate
7. Assemble unit operations in proper sequence	7. Then workmen under piecework should earn 36 cents per hour
8. Establish total time for one complete cycle	8. Hence, price per piece will be 36 divided by 9 or 4 cents each

FIGURE IX: Time and motion studies have been the source of extraordinary savings in costs and in fatigue. The secret of a reform in a wage-payment system has often proved to be careful standardization of the operation, followed by a stimulating change in the rate of payment. The established method in standard practice of carrying out this reform, both as to operation and wage systems, has eight steps, as shown under each heading

The time study completed, an analysis will indicate the amount of idle time, and the amounts of time expended in productive and non-productive motions (Figure IX).

By productive motions is meant those employed in actually performing some work on the article in process, and by non-



Natural aptitude and "experience" are no longer considered sufficient to make the average workman expert. The group of men in the top picture are learning the fine points of automobile construction. General Electric apprentices in pattern-making are shown below. In the middle picture an advanced apprentice is lining up field with shaft in a big dynamo

Motion pictures have proved extraordinarily effective in detecting wasted motions for which the eye has never been quick enough. In the motion studies at the right and left a clock dial marked off in seconds is used to record the time each move consumed. The middle film shows Henry Ford starting one of the gigantic engines at his new plant—the largest producer-gas steam engine in the world

productive motions, those necessary to put the work in position, prepare the tools and set the work aside. In the operation of making the final sizing cut on taps by passing them through a die set in the bed of a drill press, the productive motions are those required during the cut, while the non-productive ones are those required to pick up the unfinished tap and place it in the chuck, and to pick up the finished tap, gage it and put it in the box of finished work.

This preliminary analysis furnishes us a formula by which to determine the line of least resistance in effecting a saving. For instance, if the non-productive time is seventy-five per cent and the productive time twenty-five per cent of the total, there is, as a rule, a much greater margin for possible economy than in an operation where the productive time is seventy-five per cent and the non-productive twenty-five per cent.

In the latter case a study of the machine is necessary to attack the operation at the point where there is the greatest margin for improvement. But for the scrutiny of human rather than mechanical motions, operations showing an excess of non-productive time are especially inviting.

In gang operations with more than one man running a machine, the next step is to determine the amount of idle time of each workman in each complete cycle of motions. As to labor conditions in an entire plant, the data concerning the productive and non-productive times furnishes a fairly accurate index of the operations which will benefit most from motion study.

HOW TO SET TIME STANDARDS FOR UNIT MOTIONS

IN the detail procedure of making a motion study, commencing with the instant the workman starts to pick up a new piece of work, the efficiency engineer observes the successive motions through the entire operation and by eliminating the useless, determines those motions that are absolutely essential to accomplish the desired result. Then it is necessary to study each motion as a unit and as to its relation to the motions immediately preceding and following, to determine the easiest and quickest way to perform each.

The term *motion* may perhaps be misleading. It is a mistake, as a rule, to attempt to analyze an operation into single motions. The aim is rather to cut it up into what might be termed *unit operations,* as to:

(a) Pick up work and lift to machine.
(b) Adjust work and start machine.
(c) Cut.
(d) Take work out of machine.
(e) Deposit in pile of finished work, and return to unfinished work.

It will be noted that each of these is, in reality, an operation and may be made up of several motions. However, for the purpose of simplicity in description each of the unit operations will be referred to as a motion.

After assembling the unit motions into their proper sequence to perform the work undertaken, we determine the total time for one complete cycle by summing the time of all the units The unit times are determined by actual timings of the unit motions as made by the workmen operating at a normal rate of speed. By making from five to twenty timings of each unit motion as executed by several different workmen, and selecting a standard from those timings which appear correct, it is impossible for the workmen to deceive you by loafing or "soldiering" while under observation and an absolutely fair total time may be set for the complete cycle.

In making time studies, it is only under exceptional conditions that observations can not be taken with the stop-watch in full view of the workmen. In setting the standard times an average of all the observations made should not be taken, but widely divergent timings may be discarded before the readings are averaged (Figure X).

Only recently in the making of a study, a workman under observation required, 0.05, 0.07, 0.12, 0.21, and 0.25 minutes to lay down the finished piece and pick up the unfinished piece five different times. His intent was obvious. In this case the last two timings were ignored and a standard time for the unit motion of 0.08 minutes established.

In dividing an operation into unit motions for the purpose of timing, it is important to select some distinctive and easily

Old Arrangement	HOW AN OPERATION WAS STANDARDIZED	New Arrangement
Refolded Unfolded		Unfolded Refolded

Operation: Refolding under vests—an all-hand operation.

Description Original fabric comes in tubular form and, for the sake of economy, incision for waist line arm and arm pits is made in center of garment. This necessitates refolding each piece so that the outline cuts of the waist and arm pit are brought to the edge of the piece.

Old Method

Two piles of vests placed on bench side by side, the unfolded ones on the right, with man standing at foot of right hand pile.

Sequence of Motions

1. Reach forward with both hands to cut end of garment (known as top).
2. Insert thumbs of both hands between the two sides of cloth and two fingers of each hand placed on outside of garment, the loose points at neck of armhole being grasped. This forms the commencement of new fold.
3. Lift garment from bench bringing it down in front of operator and drawing the points grasped away from each other. This straightens the old crease and begins forming new one at sides.

4 & 5. Shake the garment twice (average), to perpetuate the fold down the side.

6. Step to refolded pile.

7 & 8. Raise garment over pile of unfolded vests and swing bottom in air until it is some where near bottom of pile. Then lay garment down. Bring top as nearly as possible in alignment with top of garments already folded. Owing to length of vest it was impossible to lay it in alignment with folded pile without adjustment.

9 & 10. Adjust the garment to align with pile. first at bottom, then at top.

11. Step back to first position.

New Method

Two piles of vests directly in front of man, the unfolded garments furthest away. The tops and bottoms of the two piles in line, the tops to right of man.

Sequence of Motions

1. Reach forward to unfolded pile, right hand at top, left hand at bottom.
2. Simultaneously insert middle finger of each hand between the cloth and press same with thumb and first finger. This starts new crease.
3. Draw garment forward and place the points grasped at the corner of the folded pile nearest the operator. The nap of the cloth of the garment being folded adheres just sufficiently to the pile so that the vest can be peeled off, but not sufficiently to disturb the pile beneath. The distance from side to side of garment is so much less than the distance from top to bottom that it was found the unfolded vest could be placed on the pile so accurately that further adjustment was unnecessary.

Results: Savings of two-thirds time in folding garments. Under old arrangement two men had been kept busy refolding at a cost of $9.00 per week each. Under the new arrangement. one man does all refolding and has some time for additional work. Indicating saving per year—$468

FIGURE X: The process of standardizing an all-hand operation is here recorded. On a one-man basis, the saving which resulted from this analysis amounted to $486 per year in wages alone. The new arrangement reduces the number, length and time of motions, greatly increasing the output of each operator

observed point at which to end one motion and start the next. The time required to pick up a bar of iron for inserting in a lathe would be taken from the instant the operator's hand touched the bar, until the bar touched the chuck; the time adjusting and starting until the instant the machine started, and so on.

In the setting of rates from time studies, the element of rest, time for personal needs, and so on, must be considered. The method much employed is to determine the percentage of time necessary for such purposes in each case under observation, deduct this percentage from sixty minutes, divide by the standard time and so determine the number per hour that should be produced. Ten to twenty-five per cent is then added to the average hourly earnings of the workman operating under the old methods, and the price per piece established by dividing the standard number per hour into this amount. As the very basic principle of scientific management is less unit cost with opportunity for greater wage return, it is imperative to set a standard that will enable the workman to earn more by the new method than by the old (Form XXX).

Any benefits derived must, of course, be shared with the workmen, as it is only by this means that the new methods can be perpetuated. To the average workman even then it seems too much trouble to make the effort to break away from the old method of doing his job. Written instructions, wage incentive, personal direction, and, for a time at least, constant supervision are all necessary. After a time increased wage return, less fatigue, and the habit formed of doing the work with the proper motions, insure the performance of the operation in the standardized manner.

HOW THE MOTION PICTURE FILM RECORDS TIME STUDIES IN THE FACTORY

WITH the aid of the moving picture machine, even quicker than the eye motions can be taken apart and the workman taught how to put them together more expertly.

A workman in an eastern factory was assembling a machine. The parts were within easy reach, and he was working rapidly

and skilfully. An expert watched him intently for several hours. The best record the workman made was thirty-seven and a half minutes for a machine. Another workman accomplished the same thing in a little over forty minutes. Apparently one was as skilled as the other, and the expert could detect no difference, nor anything that would simplify the work of either.

Man No.	Time Taken			Remarks
	Max.	Min.	Aver.	
201	10	6	9	Average Man
220	12	7	10	
235	14	9	13	Slow Man
218	8	5	6	Exceptionally Good Man

Standard time. _____ 8 Minutes
Allow 10% for rest and needs = 6 Min. Per hour.
Output per hour = $\frac{60-6}{8}$ = 7 pieces
Hourly rate ... 25¢
Allow 20% increase over day rate
Piecework rate = 30¢ per hour
Piece price --- $\frac{30}{7}$ = 4.3 cents each

Earnings under piecework on basis of average output under old conditions

Man No.	Aver. time taken	Output per hour	Earnings per hour Cents
201	9	6.0	25.8
220	10	5.4	23.22
235	13	4.1	17.63
218	6	9.0	38.7

Allowing 10% or 6 Min. Per Hour for resting and personal needs.

FORM XXX: Fixing upon a standard time and a stimulating rate is a vital matter. Upon these two points, the whole wage system will stand or fall. The method is to make a careful time study of the working speed of different men. How this is measured and calculated here appears in detail

A moving picture record was made of the whole process, nearly forty minutes of film. Then, using a magnifying glass, the expert studied the photographic record for days. Finally he began experimenting with tables and frames and different forms of holders for the machine parts. Today the workman whose

best record was thirty-seven and a half minutes is putting that same machine together in eight and a half minutes, doing it more easily than he did before and at higher pay.

In a garment factory two women side by side were using sewing machines geared to the same speed. Apparently they were workers of equal skill. An expert watching them could detect no waste motion on the part of either. A certain seam took approximately three seconds and involved about twenty-five motions. But one seamstress took a little over three seconds; the other a little less. Here was a difference that in the course of a day was proving costly to the slower of the two, and costly to the manufacturer.

Moving pictures were called in, and here, because of the quickness of the work and the narrow margin of variation, the time element was an especially important factor. A clock of special design, which makes readings down to a small fraction of a second, was placed beside the worker where it would show on each film.

A film record was made of each worker at her machine, and the expert took the prints into his office and sat down to study them. That study lasted for days. But it ended in experiments which shortened that operation, and others connected with it, until it is estimated already that the efficiency of the shop has been increased several hundred per cent.

These two instances illustrate how work-motions can be pulled apart, analyzed and built up again.

This is not done by making "movies" of right and wrong ways and then asking the workers to study the contrasted schemes. The workman may never, except in special cases, when he has to be convinced of a fact, see the pictures at all. They are never even shown on a screen. Instead, the expert takes a long print from the films, whereon are shown not only the motions of the operative, but the elapsed time, by means of a clock which splits seconds into small fractions, and studies them to see how long each motion takes, and how it could be shortened. Primarily, the method relies for its success on the sleight-of-hand truism that "the hand is quicker than the eye."

In the first-mentioned instance of machine assembling, for example, the various parts of the machine had been brought to the

assembler and placed on his bench. The assembler put the base of the frame in position, looked about for the first support, put it in place, and then repeated the process till he had completed the machine. That there was waste motion was not apparent to anyone but an expert, and even the latter did not realize how far from economical many of the motions were till he studied them separately, with the clock recording on each film the time it had taken.

This analysis showed that time was being lost because the parts were not arranged as conveniently as they might be, because the workman's bench was often not at the most convenient height for his stature, and because he was reaching too far. The experts studied the order in which every part was put in place, and then devised a frame, standing upright beside the assembler, with hooks or spaces where a boy arranged each part. These were arranged in the order of their use, from left to right. An assembling table of adjustable height, for use with different sizes of machines and for workmen of different stature, was provided.

Then the workman was asked to put a machine together aided by the new equipment. He was taught how to stand and how to reach for each part. From the first the method was found to work satisfactorily. With practice, and further adjustments as experience and further film records suggested, the time was gradually reduced till it stood at less than one-fourth of the original.

A machine operation, the milling of bushings, was analyzed in the same plant. The workman had been in the habit of reaching into a box for the bushings, and after they had been milled dropping them into a box behind him ready to be carried away. This was the traditional way, and the operative who helped with the experiments was so skilled that there seemed hardly a waste motion. Moving pictures were used, and the clock emphasized the long reaches that the workman was making for his raw material and with the finished product.

The answer was an arrangement whereby the bushings were placed in a hopper above the bench, from which they dropped directly into the workman's hand. A hole cut through the bench enabled him to drop his finished product into a box beneath.

Two long reaches were cut out, with a consequent saving of many minutes of each hour's work.

A man can make about one hundred and fifty thousand motions in the average business day. If the number involved in a standard operation can be halved, his effectiveness as a worker has been multiplied by two. But to reduce the number of motions, cutting out entirely the needless ones and shortening others that are too long, the observer must be able to know exactly what those motions are, their sequence, and the precise time that they occupy. The film enables the factory man to take a motion apart and keep the pieces for study.

UNIV. OF
CALIFORNIA

Part III

WAGE-PAYMENT PLANS AND HOW TO USE THEM

AUTHORITIES AND SOURCES FOR PART III

Chapters XI and XII. Contributed by C. Bertrand Thompson, lecturer on manufacturing in Harvard University, from his experience in scientific management work.

Chapters XIII and XIV. Contributed by Mr. Porter from experience in the reorganization of several plants, together with extensive studies embracing more than 125 plants, including such lines as textile manufacture, electrical works, pump and hydraulic machinery plants, hardware making, radiator companies, brass foundries, enamel-ware making, excavation work, etc.

Chapter XV. Developed by Mr. Rockwell from a study covering all the more important profit-sharing enterprises, including the Ford plant, Simplex Wire and Cable Company, Dennison Manufacturing Company, Houghton Mifflin Company, Samuel Cabot, Inc., A. W. Burritt Company, Farr Alpaca Company, Boston Consolidated Gas Company, Brooklyn Edison Electric Illuminating Company, Eastman Kodak Company, R. F. Simmons Company, Bourne Mills and N. O. Nelson Manufacturing Company.

Chapter XVI. Contributed by Mr. Porter from his experience and that of other engineers in the reorganization of an eastern copper-alloy mill and foundry.

Chapter XVII. Developed by Mr. Murphy and Mr. Porter from a study of timekeeping methods in many industries, including Marshall Field & Company, a stores fixture factory, Michigan Stove Company, Clothcraft shops, the Florence Manufacturing Company, Simplex Wire and Cable Company, Amoskeag Company, the Manila Bureau of Printing, a contracting company, a plant organized under scientific management, and six other plants.

XI

FIXING THE REWARD FOR WORK

"HOW do you pay your men?" the manager of a thriving New England plant employing about a thousand hands was asked.

"I started thirty years ago with a straight day rate, and an occasional piece rate in some departments. Now I am using about every system there is: day rate, piece rate, premium, bonus, some Taylor differential piece rates, and salaries and commissions in the administrative and selling departments."

"Why do you use so many methods?"

"I have had to in order to meet the changing conditions of the labor market, not only with day laborers, skilled workmen and machinists, but with clerks, executives and salesmen. Men are entitled to a wage for giving me their time to dispose of. I have to pay my watchmen just to be present, though they may have nothing actually to do once in ten years. But what I want more than anything else is that my men shall employ their time productively, turning out goods, superintending manufacture more effectively or selling my output. This takes more than their time. It takes their energy, their thought, their interest and their enthusiasm. I found that these desirable things could not be had for a mere day wage. The problem of securing them was one of market conditions and the psychology of the workers.

"My grandfather ran a mill where the women who tended the machines would leave them whenever they liked and go out to look after their children playing in the factory yard. These occasional absences didn't make much difference, since they were working twelve hours a day. Then the shortening of hours

began, until now I am running only forty-eight hours a week. In the old days competition was not very keen, and all industry operated at about the same level of inefficiency. Today we have to work for all we get. And above all we must have efficiency in the factory and in the selling field.

"When the pressure began to be felt, we could get our work up by the simple though disagreeable process of driving. But that does not serve any longer. Workmen, especially if they are skilled, and competent executives and salesmen, do not have to stand it."

What the employer wants, in most cases, is of course not the mere time and presence of the employee, but his productiveness. If the manager could abolish day rates and pay only by the piece for what the man produced or sold and nothing more, he would do it. Or, if he held to the day wage, he would like to pay only for the time actually spent on production or selling. He would have time tickets for every moment of the day, and would pay on those only which were productively used. If a man waited about between jobs it would be on the man's own time. This is, of course, impracticable. Many delays between jobs are inevitable, and others the management has not taken the trouble to eliminate. In the majority of cases the employee who waits is not the one who is responsible for the delay, and his living cannot be made dependent on other people's failures.

"The question I have to solve," said the manager, "is how to get all the time of my employees occupied productively, continuously and efficiently."

The old answer to this question, and one still tried in some places, is plain driving.

The expedient of cutting piece rates to such a point that the worker will have to go at a furious gait to earn a living is a familiar one. A big company in Pennsylvania worked this plan regularly for several years, until in the end its men struck. Others are still doing it, and have "gotten away with it" thus far; but competent workmen quit such concerns, and those who remain are merely waiting for a good chance to break away.

Human nature reacts on this practice in much the same manner in all grades of employment. The contract system is a modification of the day wage, intended to accomplish some de-

gree of speeding up without placing the responsibility for driving where it belongs—on the employer. The manufacturer hires the contractor at a fixed sum, and the contractor sets a rate of pay and a speed of work which will enable him to get as much as possible out of the contract. He has every incentive to drive the laborer up to and beyond the limits of safety. This is the essence of the sweating system. Its excesses can be restrained only by law, or by the employer who steps in between the contractor and his force; and if he does this he may as well eliminate the contractor altogether. This is just what has happened at a great locomotive works which once had a full-fledged contract system, but now retains only the name. Its contractors have ceased to be anything but sub-foremen.

This policy is rapidly waning in popularity, all the more rapidly as labor becomes more effectively organized. The elimination of ruthless driving is one of the best things to the credit of the labor unions. Where the work is mental rather than physical, as in the case of salesmen, executives and clerks, driving has never resulted in permanent gains.

Intensified competition among managers, and a growing self-consciousness and independence in the workmen, have made it imperative that some incentive to increased production be provided, which will accomplish what driving was intended to do but did not. To provide this incentive is one of the tasks of management today, and although it is not to be inferred that every manager needs to install a long list of different payment plans, adjustment of reward to work is essential to efficiency.

INCENTIVES TO INCREASED PRODUCTION THAT HAVE SUPPLANTED DRIVING METHODS

THERE are four principal levers by which you can move a man to action: fear, pride, ambition, loyalty. Not all men can be moved by all these, nor do they all have the same value as incentives to efficiency. Fear is one of the strongest of the emotions but is brutalizing in its effect. Hence it is least effective, and is becoming daily more difficult to apply, except in unusual conditions. Mere pride or emulation, when aroused, works beautifully for a time, but may soon wear out. People soon

get tired of either winning or losing, especially if the game is costing them considerable effort, and the only reward is "honorable mention." But when combined in some way with a more substantial gain, pride may be made a powerful incentive. Ambition, when effectively appealed to, is stronger still; but the longest lever of them all is loyalty. People will do most and best when they are deeply and fundamentally loyal. Loyalty like love is a more or less unreasoning force, which has but one aim: to do one's best for mistress or manager.

These levers can be swung on two fulcrums: the market rate of wages, or a rate above the market. Money, of course, is not the only stimulus to ambition. Promotion is a powerful force and one not to be forgotten. But the purpose here is to show how wages "at the market" may be modified to rouse the motives of efficiency, and also, how "wages at the market plus" can be applied to the same end.

The market rate of wages obviously makes no appeal to ambition. The forces determining it are apparently beyond the control of the individual laborer, and ambition appeals to the individual.

In a few rare cases emulation may be brought into play. A scheme has been worked out in connection with construction work whereby the contractors succeed in getting gangs and individuals competing with each other. "Athletic contests" are arranged between gangs building piers. Both start at exactly the same moment on the same kind of pier; they have the same service, the same bricks and mortar. The winners are decorated with buttons. When unaccompanied by adequate rewards, this works well for a short time; and by the time the enthusiasm has died down the job is ended and the contractors are elsewhere starting the same "contests" with a new set of workmen. If the contractor, however, cherishes a sincere and personal interest in his men and gives it adequate expression in the form of vacations, extra wages, and welfare work, enthusiasm and emulation remain alive and "contests" continue to ring true.

The goad of fear will make a man work better than no incentive at all. With wages at the market it can be brought into play only in bad times, when other jobs are scarce. When all employers are "full up" the men with the jobs have got to

do what the boss tells them. When machinery sets the pace, driving in its most ruthless form may result. On the other hand, there may be no driving at all, depending on conditions.

Fortunately the incentive of fear has practically ceased to operate, especially with skilled men and in highly organized trades. The competent salesman or artisan can always get another job, and the unions will see that the ordinary man is not allowed to starve for asserting his manhood. And it is well for the future of efficiency in industry that the employer is forced to appeal to some more humane and elevating motive.

The thing to do is to arouse the enthusiastic loyalty of the employees. Sometimes that is done by the sheer force of the personality of the employer. Some managers are "magnetic." They draw people about them by their personal charm. They seem to emanate fairness and democracy. Every member of the force feels that the manager knows him personally and likes him. This is a gift of the gods.

The president of a great company with five plants in different parts of the country tells me that one of the chief reasons for his success in dealing with his employees—and his men all swear by him—is the fact that his door is always open to anyone who wants to see him for any purpose. Unfortunately this policy is limited in its application both by the personal deficiencies of many employers who have not this divine gift, and by the defects of organization which do not permit the ordinary manager to spend very much of his time on these "confabs."

WHEN WELFARE WORK CONTRIBUTES TO EFFICIENCY AND WHEN IT FAILS

A POLICY which is attracting increasing attention is "welfare" work, which at its best is the policy of doing things for the employees which they could not do for themselves—not from charitable motives but with the object in view of making the conditions of their life more attractive and healthful and their work more efficient.

This is a somewhat risky policy, beset with dangers and temptations. It has had some conspicuous failures; but it has also been made to succeed conspicuously. It appears to work best when it comes in response to the real needs of the employees, like the

reading rooms at the desert stations on the Santa Fe; when it is done unostentatiously and not for the mere purpose of advertising; and when it is done inexpensively and economically, so that there can be no suspicion that large sums are being spent on frills which had better be paid out as wages.

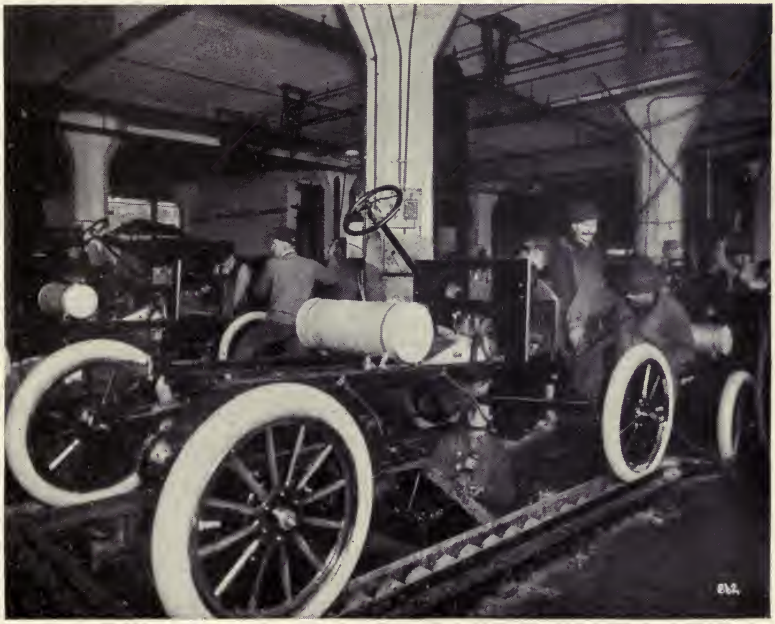
Here again the personal factor enters largely. When "welfare" work is in the hands of an unpopular man it almost invariably fails.

These supplements to "wages at the market" are helpful, when the situation is such that they can be used; but it is the opinion of many managers that after all they are supplements only, and that the body of the problem is the setting of a fair market rate. If your employees are convinced that their rates are fairly set, there may be no great active enthusiasm, to be sure, but you will have a basis for a powerful appeal in time of stress. This raises the question, "What are fair wages?"

Merely to answer, "the prevailing rate," is not to answer at all. For the question is, in other terms: "Can it be shown that the prevailing rate is fair?"

The wages which might possibly be paid lie somewhere between the lower limit of subsistence for the employee and the lower limit of subsistence for the employer. If the employee does not get at least this minimum he will quit or die—or both. The employer, on the other hand, has got to get enough to pay his employees, to pay for materials and equipment, and to support himself. In addition, he has got to clear enough to make it worth while for him to stay in business and take the risk and the trouble that this involves rather than subordinating himself and taking employment with somebody else.

The value of the product has nothing to do with these minimum limits; nor have these limits much to do with the value. Society, the whole body of consumers, sets a value on the product quite independently of the wants or needs of either employer or employee. In the bicycle business, for instance, when the community at large decided that it no longer cared much for bicycles, no amount of need on the part of manufacturers could induce society to pay what would have been necessary to keep them in business. Neither did the fact that a large number of people were thrown out of work when the desire for bicycles disap



Two of the famous labor-saving devices at the Ford Motor plant are here shown. Above is the process of assembling the magneto. A continuous stream of work sets the pace, while the arrangement of parts and the skid-way enable every man to give a good account of himself. The completed chassis is tested on the roller-tracks (below), and run to the shipping platform under its own power

An automatic conveyor (upper right) provides one way of maintaining the rate of production. Packages are automatically weighed out, and are then closed as they pass by the workers. In another shop (below) a trucking schedule helps to keep each man supplied with work. Product is taken away as fast as completed. The girl in the upper left picture is inspecting parts and counting by weight

peared have any effect on society's valuation of wheels.

Society sets the price or value of work done for it in accordance with methods of its own, entirely distinct from the needs of either employer or employee. Their payment has got to come out of that value; somehow or other it has got to be divided between employer and employee; and the whole question of fairness centers around the mode of this division.

The popular theory among many economists today is that the division is made in proportion to the relative contributions of each group and even of each individual engaged in the process of production and marketing. This would be comforting if it were true; but unfortunately it does not seem to fit the facts. There are certain stages in the progress of some kinds of work where you can reckon the actual physical contribution of an individual workman with some degree of accuracy; but in no industry is it possible to determine what proportion of the value of the finished and marketed product was contributed by any one workman or group of men.

If the theory won't help us, perhaps the facts will. Statistics show with some clearness that the wages of unskilled laborers vary with the cost of living. When the cost of subsistence goes up wages must go up too. Wages of skilled labor are those of unskilled plus a certain addition, determined by several factors, as will be seen in a moment. Statistics again show that the wages and salaries of skilled workmen vary fairly closely with the standard of living; but it is not clear in this case which is cause and which is effect: that is, whether high wages make a high standard of living, or vice versa. The probabilities are that it is both; when wages go up, the standard of living rises; this makes a new minimum of subsistence for the skilled man.

The trained man is also helped by the possibility of getting more in some other line of employment. The employer has no measure of productivity in many cases by which to set the salary; he has to go by what his man can get elsewhere; he has to pay the man's "opportunity cost," as the economists call it. Your clerk getting $1,000 thinks he can earn $1,500 writing advertisements; so he threatens to go into the advertising business. If you want to keep him you have got to come up to his new expectation, especially if he is really a competent man, and the

chances of success are in his favor. Skilled men are comparatively scarce; the demand for them is great, and their opportunity cost is therefore higher. They get higher wages than the unskilled, not because of any social obligation felt by their employers, but because they are able to command them.

Another important factor in determining the division of the value of the product between the employer and the employee is organization. Organization counts tremendously in deciding what share of the zone between the limits of subsistence of the employer and of the employee falls to labor.

In the popular mind, to which appeal must finally be made in the questions arising between capital and labor, a fair wage is that which permits the employees to maintain the standard of living to which they are accustomed, and which therefore rises with increase in the cost of living. It will vary also with the margin between the cost of materials, plus overhead, and the selling price; that is, when this margin is large and business is prosperous, labor is expected to get a larger share; when the margin falls, labor must expect a decrease of wages. This is an automatic sliding scale which public opinion will always support.

The president of a large company, who is especially interested in the handling of his labor, was asked how he determined the wages when he started a new department. He could not go by the market rate in that vicinity, for there was none. He said he began by setting the wage in accord with the neighborhood cost of living and the standard of the men he would take on for his new work; later he modified the wages as necessity required or opportunity allowed. He paid higher when he could, less when he had to.

Fairness in setting a rate "at the market" helps when trouble comes and it is necessary to make an appeal to the sense of justice of employees and public. It is thus a form of insurance, a negative benefit. It does not arouse any enthusiasm, for people expect a man to be fair, and are merely not disappointed when he is. To awaken the enthusiastic support and cooperation without which the efficiency demanded by modern conditions cannot be had, calls for more than merely market wages.

XII

PAYING A PREMIUM FOR EXTRA EFFORT

IT is pretty clear to most managers that the policy of paying wages and salaries "at the market," while it may do for the ordinary run of ordinary business, will not do at all for those kinds of business which demand the highest grades of productive, administrative and selling ability. Fair wages, sensible "welfare work," and a winning personality in the management will get and keep a fair organization of hardworking, conscientious "pluggers"; but it does not and cannot secure that brand of enthusiasm which makes the prize-winning business. You get prize-winning talent, and then keep it after you have trained it, only by offering, in some way, to pay more for it than the other fellow pays; in other words, you must set your wages and salaries somehow "at the market plus" (Figure XI).

Many plans and "systems" of paying wages to workmen have recently been invented and advocated. And yet what they all amount to is simply an expedient for paying above the market rate, and on some basis more or less directly connected with the employee's output. Where the nature of the work permits, as in factory production, some kinds of clerical work, and selling, the connection is made as direct as possible, and the bonus is in some way made proportionate to the increased output or sales. In other cases an indirect connection is established; but in all cases the aim of the buyer of labor is to pay the market rate plus something added for unusual diligence and success.

As these "wage systems" are all aimed at the same thing, to arouse the enthusiasm which leads to efficiency, their relative value depends upon the success with which each accomplishes

this purpose. Their success depends upon the conditions under which each is introduced and maintained. That system is the best which under given circumstances produces the maximum efficiency with the minimum cost and friction.

The earliest method used for this purpose was the ordinary piece rate. This permitted the exceptional workman to earn a daily wage somewhat in excess of that currently paid. It got as high a degree of efficiency as the workman was able to devise for himself. It was easy to introduce, and worked well—until the management began to feel that the men were earning too much, and proceeded to cut the rates. The succeeding history of this process is too well known to call for narration. Its inevitable result was to call the unions to the protection of their members from this form of injustice; and the result is that, except under the strongest guarantees that the rates will not be cut, the unions have in general opposed the system. Any change from day rates to piece rates, unless most carefully made, is apt to arouse the opposition of the workmen; and if it is carried through in spite of them, they will take it out in soldiering, so that the effort to get greater production is defeated. One big concern obviates this by forbidding its employees to earn over what it considers a fair day wage. The men are all on piecework, but when they have earned what the company says they should, they are expected to loaf. Of course, they simply stretch out the time on each job so as to come out even at the end of the day. This is about the worst possible system, both for the management and the men.

Many progressive concerns have improved on this by giving a basic guaranteed day rate, with an addition for each increase over the normal production. They have added to this a systematic course of instruction, so that their employees may increase their output to the limit.

The Towne-Halsey premium plan is another system easy to introduce and maintain, and productive of results. As used originally by the Yale & Towne Company, it consisted in setting a standard time in which a job should be done, based on the best time in which it had been done in the past by an average man. Then the workman was given half or one-third the time he saved in doing the job. If the standard time was eight

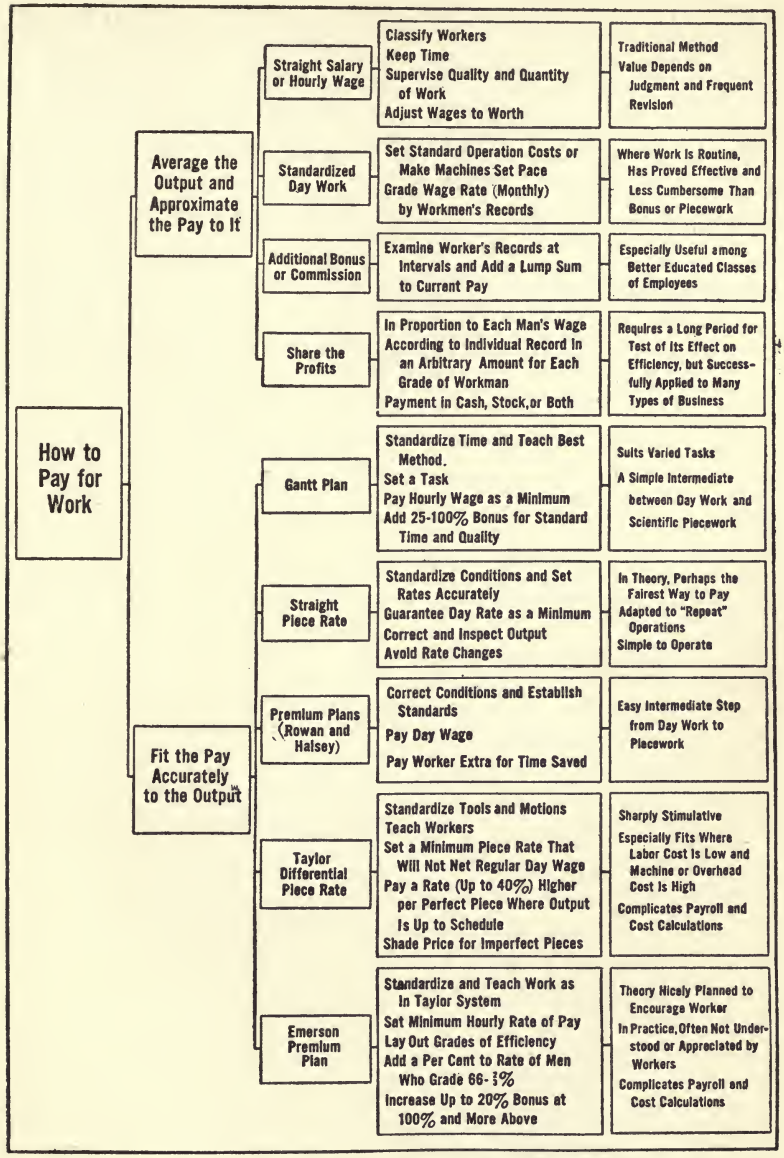


FIGURE XI: Payment plans which are most favored are standardized day work, straight piecework, the Gantt, Taylor and Emerson plans and profit sharing. Many variations of the bonus or premium principle might be listed. The modern principle, however, is to standardize working conditions, find the best way to do the task, set a minimum wage to reassure the worker who may fear an actual loss in wages and then pay him for the work he actually does

hours, the rate 30 cents per hour, and the man did it in six hours, there was added to his regular wage of 6x30 cents, or $1.80, one-half of 2x30 cents, or 30 cents, making a total for the job of $2.10, or 35 cents per hour. The man got a higher rate and had in addition two hours to apply on another job on which he could be earning the same or a higher rate; the firm's overhead was less, its labor cost was lower, and it was under no temptation to cut the rate.

The trouble with this system came in the method of setting the standard time. That was left to the men, and of course their tendency was to make the standard time as large as possible, for so long as standards are set by past performances and not by the aid of time and motion studies made by an expert, it is strictly true that the standard time is set by the men. There are two ways of meeting the difficulty. One is to reduce the rate at which the premium increases; the other is to set the standard time in a better way. The best known method of reducing the premium is the Rowan plan; the leading exponents of the other method (which was finally adopted in the Yale & Towne plant) are the followers of Frederick W. Taylor.

HOW THE PREMIUM IS FIGURED UNDER THE ROWAN PLAN

THE Rowan plan takes the standard time as set by the men, just like the Towne-Halsey. But the premium is figured differently; the workman's share is a percentage of his regular rate equivalent to the percentage of the standard time he has saved. If the time is eight hours, the rate 30 cents, and the work is done in six hours, the two hours saved is 25 per cent of the standard, the regular wages are 6x30 cents, or $1.80, and the premium is one-fourth of this, or 45 cents. In the early stages the premium is usually higher than by the Towne-Halsey plan; but it decreases as the amount of saving increases. This increased gain in earnings, of course, destroys the incentive to beat the management; but it is equally effective in penalizing honest efforts to make great gains. The first 20 or 30 per cent increase in efficiency is easy for any good man; it is the higher percentages which become difficult; and it is just those higher percentages which are paid for at a lower rate by the Rowan plan.

Nevertheless both the Towne-Halsey and the Rowan plans have at times been strikingly successful. But their defects are glaring, and it was to remedy these that Mr. Emerson evolved his system. First he sets a standard time partly in accordance with past achievement, and partly in accordance with what an expert time study shows would be right. This standard is called 100 per cent. A workman must reach 66 2-3 per cent of this to hold his job. For every increase of efficiency beyond 66 2-3 per cent he gets a bonus, very small for the first increases, and becoming larger as he approaches the standard. At 100 per cent he gets 20 cents bonus on the dollar of wages; over 100 per cent he gets one cent for each 1 per cent. Thus at 140 per cent efficiency he gets a bonus of 60 cents on the dollar. The management can afford this on account of the lower overhead cost per unit of product.

This system involves a little more work on the part of the management than the other in setting the standard time, yet it is conservative and ought not to arouse antagonism. It pays the men a guaranteed base rate, and an increase for any improvement in efficiency, this bonus increasing as the difficulty of further increasing efficiency becomes greater. It does not leave the loophole for beating the management that exists in the earlier premium plans which relied entirely on past performance records. On the other hand, the gradual increase in pay, beginning at the first little increases in efficiency, allows the easy-going, unambitious workman a chance to get a little better output and stop there, content with his slightly increased wage. A universal incentive to strive for the best possible results is lacking.

The Taylor system (and the Gantt, which grew out of it) is based on a radically different set of principles from all these. It sets a standard time for each job with a precision as nearly scientific as the nature of the work will permit. Materials, equipment, processes and methods are perfected first; then the workmen are trained carefully and patiently to the performance of the work in the best way that experts can determine; the result of this process is the standard time. It is what the trained man can do under circumstances made as nearly ideal for him as the management can devise. After the management

has done its part, which is considerable, Gantt says to the workman:

"Now we will pay you your usual wages until you have learned to do this in the proper time. We will provide you with an instructor and with all the conditions which are necessary for you to do it in this time, and when you have succeeded we will pay you from 30 to 60 or 100 per cent bonus in addition to your regular wages, depending on the nature of the work; but whether you get up to the standard or not you will never be paid less than your present wages."

The plan known as the Taylor differential piece rate makes the same proposition as to standard time, conditions and instruction, but says to the workman:

"When you have learned to do this in the standard time, we will pay you a piece rate higher than you have had before; but if you fall below the standard your piece rate will be lower. With a high output, you will get higher pay for more pieces; if you fall below, you will get lower pay for fewer pieces." This is in effect a tremendous inducement to high efficiency, combined with a penalty for failure (Figure XII).

REMOVING THE DIFFICULTIES BETWEEN EFFICIENCY SYSTEMS AND LABOR UNIONS

THESE methods, of course, set their standards with due regard to what a capable worker can do permanently without injury to his health, as has been shown in several elaborate investigations. They are strongly selective; they appeal most to the ambitious, the energetic and the intelligent; such workers are brought to a high plane of efficiency and are kept there by the prospect of the entire loss of the bonus if they fall below it. On account of the rigidity with which the standard is set it is impossible to beat the management; and as the gain is shared between the employer and the employee there is no incentive to cut rates, and every inducement to keep them up. The percentage of bonus that goes to the workman is not arbitrary, but is the result of experiments made to determine what percentage would get the largest number of workmen up to the standard. And the results of the system when it is applied in its entirety are in some cases so extraordinary as to seem incredible.

But, on the other hand, the Taylor system is the most difficult to develop and maintain. It involves a degree of intelligence and ability on the part of the management which is comparatively rare. Though the results read like a fairy tale, to get

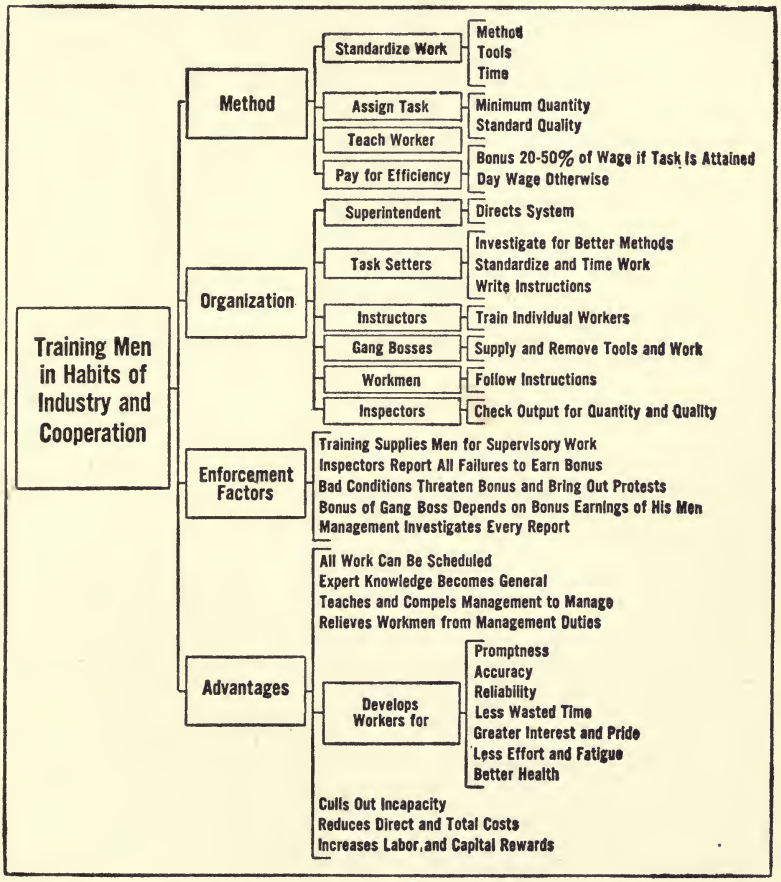


FIGURE XII: The announcement by H. L. Gantt of his plan for "training men in habits of industry and cooperation" by a task and bonus method of work and pay marked an epoch in the study of factory efficiency. How the system is installed, and the advantages his experience ascribes to it, are indicated

them requires an investment of time, money and patience which few feel prepared to make. In addition, there is a tendency on the part of the unions to oppose all "efficiency" systems, under

which term they hash together everything except straight day rates.

The difficulty with the men, however, is insignificant in comparison with the trouble which the management has with itself. The Taylor system is a radically new departure which calls for an entirely different spirit and attitude of the management toward its responsibilities. It challenges the management *to manage;* and this is precisely what they are most averse to doing, so long as they can get along somehow or other with the men managing for them. Isn't this a question for every manager to consider?

The problem of the relation of the labor unions to all systems of efficiency is not so hopeless as it seems. The unions have been productive of an immense amount of good; and the evil for which they have been responsible is due partly to the stand of their employers, and to the ignorance in regard to economic conditions and facts in which they have been left by those who ought to know better. Their opposition to piece rates, for instance, is entirely justifiable, in view of the history of this particular method of payment.

On the other hand, their aversion to modern methods of management is chargeable to two causes, both of them bound to disappear: the fear on the part of some of the leaders that with wages paid in proportion to efficiency there will be no further need for unions, and the fear on the part of the rank and file that increased output means a decrease in the number of those employed.

Not all labor leaders share this type of fear, however. Some of them see that their unions exist for many other indispensable purposes besides getting higher wages; and that even with the best bonus system there will be the same necessity for organized labor to protect itself against the greed of unscrupulous employers who will succumb to the temptation to cut bonuses as their forefathers cut piece rates. The only way to meet this is by an unvarying and long-continued regime of absolute fairness and reliability in their relations with their workmen on the part of all employers.

The other objection, that increased output means diminished employment, is more subtle; yet the facts of history show how

increased output means, in the long run, lower prices, greatly increased demand, and increased employment to meet the new demand. Also that it means a larger dividend in which the laborer may share, and a lower cost for the products which he consumes.

With the disappearance of these two fears, employers and unions are bound to unite eventually in a common effort to increase the efficiency of production and distribution.

XIII

MAKING THE MOST OF DAY WORK

DAY WORK is one of the two "natural" ways of paying men for their services. Piecework is the other. Bonus and premium systems are all variations of either one or the other. As a matter of fact, all systems go back to day work as a basis, and all are attempts to remedy seeming shortcomings in the ordinary day-work plan. And all, in the final working out, practically resolve themselves into essential day work. But in the interim, a great change takes place. Wages are raised, costs are cut, production increased, men taught to see the definite relation between stipend and service. Thus the end is good; hence, the means appears justified.

But practically all so-called efficiency-payment systems require a tremendous amount of judiciously directed persistence, a long interval of time, and a heavy expense to install. Moreover, only a thoroughly standardized plant, working on a standard output, lends itself readily to their application. And when all is said and done, even in such a plant many kinds of work remain which it is not practical to handle on any other than the day-work plan. So that the problem of making day work satisfactory confronts all manufacturers, and probably always will.

Lack of uniformity in the method of payment, such as always exists in a plant where part of the men are day workers and part under some other method, is always a source of confusion. The clerical work in arriving at costs and making up the pay-roll is complicated. Plain day workers are antagonized. Piece or bonus workers are retarded in their development. Team work, the thing most to be desired in any plant, is made very

difficult. It is a case of a "kingdom divided against itself." Day work is the only plan which permits of entire uniformity in the method of payment and is the simplest of all plans from the payroll standpoint.

In view of these things, factory managers are asking themselves, "Is there not some way, after all, of getting results with day work? Some system whereby the production stimulus of efficiency-payment plans may be secured without sacrificing the uniformity and simplicity of the day-work plan.

Fifty managers out of one hundred and twenty-five who were asked this question replied in the affirmative. A great many said, "Yes, if you have good foremen." One said, "The golden rule will do it. Men respond to 'square' treatment always." Another said, "Yes, if men are assured steady positions and good chance of advancement." Another said, "Yes, if you base raises on efficiency." Another said, "Yes, if the work is mapped out and men's rates of pay are adjusted in accordance with output; but first-class foremen are very essential." Another said, "High-class men—Yes! If they are not in that class, we drop them."

Even so prominent an advocate of efficiency-payment plans as Frederick W. Taylor, the originator of perhaps the most sharply stimulative of all, stated in a paper read some years ago before the American Society of Mechanical Engineers, "With accurate time knowledge as a basis, surprisingly large results can be obtained under any scheme of payment from day work up; there is no question but that ordinary day work, resting upon this foundation, will give greater satisfaction than any of the efficiency-payment systems in common use, standing, as they do, upon soldiering as a basis."

The following experience of an automobile plant would appear to lend strength to the statements in favor of day work by the several managers quoted and by Mr. Taylor.

The advent of a new management was the occasion for extensive reforms all along the line. The method of payment was not changed, save to abolish the contract system formerly in vogue and place all men upon a basis of direct dealing with the management.

The first step upon the abolition of the contract system was to

place all foremen on a salary basis with a schedule of bonuses for increasing production. One foreman refused to stay at $30 per week. Many quit without parley. But others were soon found to take their places, glad to work on the new basis. One foreman, who had the contract for making seats, was found to have cleared in a day as much as the average foreman received in salary in a month. No wonder such as he refused to continue on a salary basis at $30 per week!

Simultaneously a department was established to design special tools and equipment, also a planning department to work in conjunction with the tool and engineering departments.

It became the duty of the planning department to set about at once to ascertain the exact time and cost of all operations. Accordingly, the men were all put on job time tickets and required to make a record of time started and time stopped, by means of a time-recording clock, on all operations. When a job was finished or at the end of a pay period, the total pieces finished, elapsed time and machine number were entered on the tickets, and these were turned in to the planning department.

By this means, in the course of a few months, data was collected which gave the management a pretty good line on what the time and cost of each operation should be and enabled the planning department to assign the work of different men and machines with a fair degree of intelligence.

BLACKBOARD SCHEDULES THAT SET THE PACE FOR DAY WORK

PRODUCTION was controlled by means of daily reports which the inspector made out. The production of each day was required to be moved forward so that the actual daily production showed. Every department was provided with a large blackboard covered by a glass door, to which the inspector carried the key. Upon this board he chalked up each day's production. The schedule for each day was marked on the board in advance. If the schedule was reached, a certain mark was made; if not, another mark; if bettered, still a different one. As the boards were in plain view, the showing of the department

was thus kept constantly before everybody. Once a month the schedule was advanced slightly, until it had reached what, from the information of the planning department, seemed a practical maximum. At any rate, this mark was a considerable improvement.

In this way production was increased in the space of a few months more than twenty-five per cent without adding over five per cent to overhead expense, and without a change in the method of payment, save that already noted. The bonus paid the foremen for increasing production proved sufficient to make them as interested in the production boards as the management.

Another noteworthy change made was the radical rearrangement of departments, whereby the number of departments was greatly increased and each made to consist of but a few machines necessary to complete the operations on a single part. A skilled workman was placed in charge of each department and paid a little higher rate than the men under him.

It was found under this plan that the work for the most part could be accomplished with comparatively unskilled labor, as the tool and jig equipment was such that all a workman had to do was to put his work in the machine and start it going. The skilled mechanics were then used as supervisors or in the tool department.

The supervisors, from the general foreman up, were put on the bonus list, which was divided in three classes: Class A comprised the manager and his assistant; Class B, the superintendents and their assistants; Class C, the general foremen and their assistants. The bonuses for these three classes averaged for Class A, $3,000 cash per annum; Class B, $1,500; Class C, $1,000, in addition to the regular salaries. The bonus amounted to about eight dollars per car above a certain daily output, and added about five per cent to the overhead, but the production was increased several times that amount. Eventually the operating expense was so cut that the overhead was reduced from 180 per cent to 165 per cent.

Output, therefore, was increased from forty to seventy cars per day, without increasing factory space or equipment; the cost of bodies reduced from $67 to $49; a car that had sold at a loss at $2,500 now produced a profit at $1,000, without any

noticeable change in design; the time of a final assembling operation on a car cut from a day or more to ten minutes—all without changing the method of payment.

This does not say that the production would not have been further increased by supplying an additional incentive to the men. The manager is frank to admit that it might have been. But it does show that the method of payment is not nearly so important in its relation to increasing production as has been so generally supposed. What is shown to be important is: Definite knowledge of time and cost of operations; scheduling of work; separation of planning from execution; and team spirit engendered in the supervising force by means of production boards and bonuses.

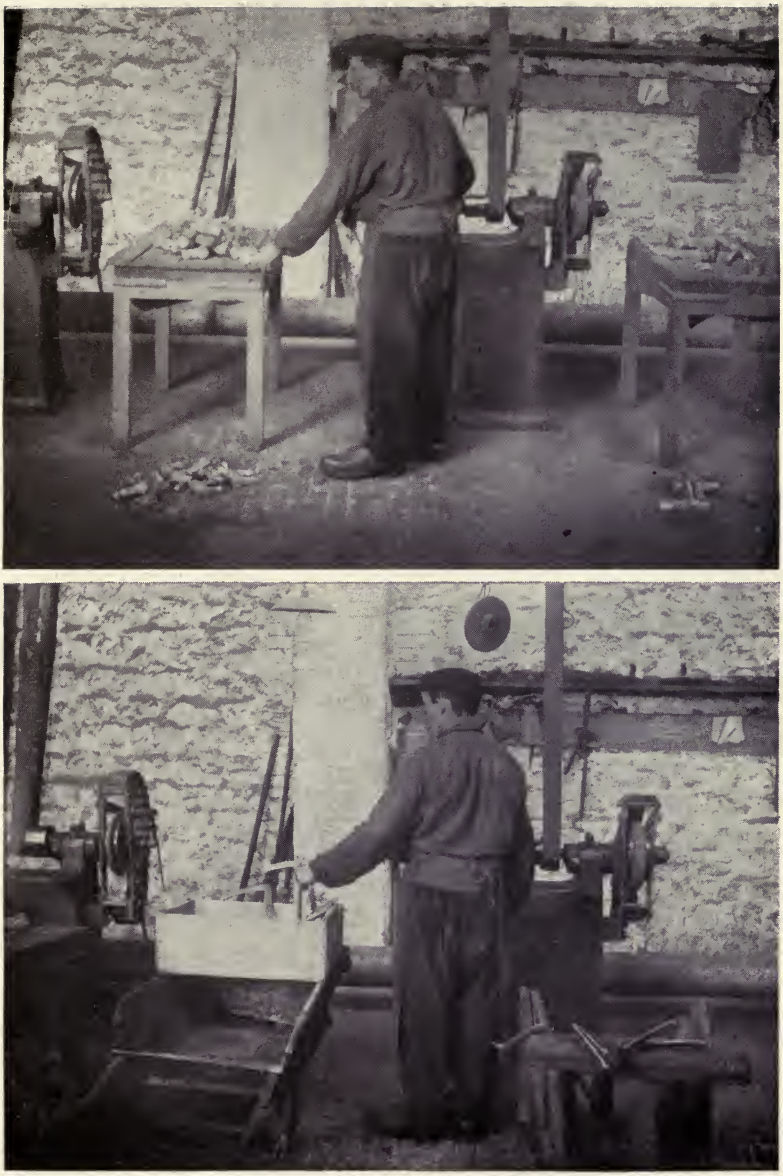
A weak spot in this plan would seem to be the omission of the workmen from sharing in special rewards for increased production. But this omission is only apparent. The men were given a bonus in the shape of a half-holiday every now and then, at unexpected times, to see a ball game, or when something extraordinary was going on in the town—*with full pay*. In all, these half-holidays amounted to two or three days every three months. That this consideration was fully appreciated by the men was shown by the fact that production suffered hardly at all by reason of the time out, as they always worked harder the next two or three days after a holiday to make up.

Their interest in the output of the plant was further enlisted by posting all large orders and making every one feel a responsibility for getting each order out on time. Numerous other expedients were added from time to time to keep the men interested and to cement their loyalty.

METHODS BY WHICH MANAGERS HOLD THE LOYALTY OF THEIR DAY WORKERS

SUMMED up in two words, making day work satisfactory requires, first, knowledge; second, interest: knowledge on the part of the management of the time and cost of all operations; interest on the part of the men, enlisted by a production scheme which appeals to the sporting instinct in every man and cemented by square and generous treatment.

Included in the square and generous treatment, of course,



Machine work before and after reorganization in a Belgian plant is here illustrated. The old way was to deliver the parts on a table, tool them, and toss them on the floor. Under the new plan, the parts came to the machine on a wheelbarrow and, after tooling, were placed in another wheelbarrow for conveyance to the next process

How rehandling material was saved in an American lumber mill is indicated by these two views. In the lower picture the operator deposits the milled lumber on a small table from which it has to be transferred to a truck. The new plan is to bring in the lumber on a truck of the proper height and deposit the milled pieces on a similar truck ready for the next move

are good wages and equal pay for equal work. Men's loyalty cannot be held, if, by reason of welfare work, half-holidays with full pay, and so forth, the management expects them to work at a lower scale than men in similar lines elsewhere. If they can get better pay elsewhere, they are bound to be dissatisfied. That the "well-paid workman is the only contented workman," is almost axiomatic. However, managers have found that most men prefer day work at two dollars per day to piece or bonus work which nets them two dollars and a half or more. The assurance of a fixed income appeals to them more than the prospect of a larger but indeterminate one. Thus it would seem that there are other elements in the reward to the worker than the mere money consideration. And it is by taking these other elements into calculation that managers are able to get results with the day-work plan.

Equal pay for equal work may well be reckoned as one of the most important of these other elements. In many instances where day work is failing to produce results, analysis has shown, as in the recent instance of a woodworking plant where the labor turnover was excessive, that men doing precisely the same work are rated widely different, not on the basis of their production, but because of the length of service, or age, or number of dependencies, or different degrees of "standing in with the boss."

Of course, length of service, particularly if the service has been faithful, is deserving of some consideration. And if it is not given due consideration, good men will not stay. How, then, is this consideration to be given if not by advancing the wage scale?

One manager met the situation by a system of bonuses based upon the length of service and satisfaction given. At the end of the first year, the men are paid a certain per cent of this year's wage in addition; at the end of the second, a little higher per cent; at the end of the third year, still a little higher, and so on.

Another advantage of day work is that under it the task of inspection is simplest. Where men are paid by the piece or where their earnings depend directly on accomplishing a certain piece of work in a given time, they are inclined to be

careless, and as a result a more or less elaborate and rigorous system of inspection becomes necessary. Even where each workman plays inspector on the preceding one, the management has to hold a tight rein under any incentive system.

The new objection to efficiency payment plans, brought out by the manager of a woodworking plant where the older workmen are allowed to hold stock and thus share the fortunes of the concern, is that they encourage selfishness, or in other words, stimulate individual development at the expense of team work. But in several organizations that are operating smoothly on an incentive basis, correctives have been applied in the shape of department bonuses, production schemes that enlist the interest of the whole force in the output of the plant, men's meetings, competitive sports and other side-line activities that counteract very largely the tendency to extreme individualism to which not only efficiency payment plans, but fine subdivision of the labor and even a highly-geared day wage lead.

Under no scheme of payment is the manager relieved from the duty of so managing that as men are stimulated to greater effort they do not lose sight of the fact that they are integral parts of one great whole, and that in the end the security and profitableness of each man's job depends on all working in close harmony for a common end—the profitableness and permanence of the industry itself. The precise form of payment is not material, so long as the treatment appeals to the men as fair and they see a direct relation between the quality and quantity of their output and the treatment accorded.

XIV

HOW TO APPLY PIECE RATES

BONUS payment eventually resolves itself into simple day work, but with this difference: Whereas ordinary day work—the payment of a sum of money for a time, not a service—makes no stipulation as to the amount of work done, bonus day work fixes the service also. The level of day wages is also raised, but not always in proportion to the increase in output. When the dead-level of higher production at bonus day wages has been reached, however, what then? How is the incentive to still greater output to be supplied—by the addition of bonus to bonus, or premiums on bonus, or how?

This is one weak point of some applications of the bonus system, or any system which retains the old day wage and bases reward for increased output on some fixed percentage of the day wage. If fixed, it does not provide for increasing automatically the reward when the standard has been exceeded or the commensurate rewarding of a workman for increments in his efficiency short of the standard. To many this seems not only inadequate but unfair. To them both a more adequate and a fairer way is to proportion reward exactly to effort as measured in output. Then the emphasis is placed on the work to be done, and not the time to be spent in doing it, and for each small increase in ability to do the thing faster there is a proportionate monetary reward.

Straight piecework, where it can be adopted, and its application is not nearly so limited as very generally supposed, ideally meets this condition, and every other form of efficiency wage payment is in a degree a makeshift or approximation. Piece-

work is the natural method of compensation for work performed. Day work really resolves itself into piecework when a worker is required to do a stated quantity of work in a stated time. But it is inadequate and unfair in that it does not increase a man's pay when, in the given time, he performs more than he is supposed to. On the other hand, if he fails to measure up, he is paid just as much, which is inadequate and unfair from the management's point of view. If a workman is entitled to more pay for more work, the management is justified in deducting pay when value received is not given. Piecework automatically accomplishes this adjustment of reward to output.

Why, then, though successfully applied to industries and operations of every description, has piecework in many cases failed to give satisfaction? Is it that the piecework plan meets some conditions perfectly, others less so, and still others not at all? Or is the complete satisfaction from it on the one hand and complete dissatisfaction on the other due to its correct application in the one case and incorrect in the other?

Analysis of failures of the piecework plan almost without exception show the fault to be primarily with the method of setting prices. In one factory (which is typical) prices were found to be set by the individual foreman, sometimes on the basis of a few hours' observation, again on the basis of what an average good man could do in a day, but most generally on the basis of what the foreman estimated could be done—that is, on the basis of guess, which is no basis at all.

Prices so set invariably breed trouble. Seldom are they too low. If too high, the men conceal the fact by limiting their output—if they have reason to expect that to exceed a certain earning will only mean slashing of the prices.

A concomitant fault of setting rates by guess, is setting them too soon. This is a very common blunder in unsystematized plants. The management in its anxiety to cut costs and get men to do a fair amount of work, without excessive supervision, makes haste to get as much out of the shop as possible on a piecework basis, regardless of conditions. Without stopping to analyze an operation or improve a condition, on the basis of the crudest sort of record, or on the "guess-about-right" of the foreman—prices are set.

"Put it up to the workmen!" is the next step. Put up to them the responsibility for keeping machines in condition, getting work to the machines and getting it away when done.

When such conditions as these have gone on for a time, only remarkable good fortune as well as good leadership will secure a readjustment without precipitating a strike or walk-out among the men.

One of the worst examples of what hastily and improperly set piece prices result in, was found in the grinding room of a large iron-working plant. There were about one hundred and twenty-five men in the room, mostly Austrians, under one general foreman and four sub-foremen, engaged variously in sand-blasting, chipping, grinding, rubbing and drilling castings for every description of sanitary fixture—bath tubs, sinks, bowls, fountains, lavatories, and their accessories.

About one-half of the room was on piecework; the other half on day work, at a low rate per hour. The pieceworkers practically ran things to suit themselves. Not one of the foremen was really competent. Work coursed through without any attempt to specialize. No attempt was made to assign jobs. Each man helped himself, and it was a case of the strongest and quickest men getting the cream of the work continually.

On some of the articles the men could easily earn fifty to seventy-five cents an hour; on others less down to twenty cents; and there were a few articles which no pieceworker would handle if he could possibly avoid it—which meant getting some day worker to do it, and the foreman very considerately kept a number of day workers handy for this express purpose.

To avoid hard feelings, the choice-priced stuff was distributed around as evenly as possible. The men would put this through in a hurry, making their day's wages ofttimes in two or three hours; then the rest of the day they would loaf through the less desirable work—quitting early and spending as much time as they dared in the toilets. Bad pieces they were given credit for the same as good ones. Pieces which did not pass inspection for their workmanship, instead of being returned to them, were accommodatingly fixed up by day workers.

Machines were located haphazard without respect to straight-line forward travel and minimum handling of the product. As

a result, one trucker was required for almost every machine operator, and material zig-zagged and back-tracked on itself to an amazing degree.

There was almost a total disregard of day workers. Although nearly half the force, they were allowed to do about as they pleased; little attempt was made to get a fair day's work out of them. Two of the operations, which were day work exclusively, were consigned to dark corners of the room and the workmen allowed to huddle together at one long bench. Incoming and outgoing work were piled indiscriminately together. Production lagged so during the day that overtime was necessary, on the part of the day workers, almost every night, and the foremen made no effort to put a stop to it because they, too, were being paid by the hour and not very generously at that, so that they were as anxious as the men for overtime, to eke out their small wages.

Finally, the light was extremely poor, from the lack of sufficient skylight area and lighting fixtures and the clouds of dust from the grinding, while the din was terrific.

RECONSTRUCTING A WAGE-PAYMENT SYSTEM IN THE FACE OF OPPOSITION

A WORSE combination of conditions could scarcely be imagined. The management was anxious to place the day workers on piecework as soon as possible, but not knowing where or how to begin, it called in an engineer. He made a detailed study of conditions. It was nearly a year before any new piece prices could be fixed or old prices adjusted. When it was attempted to put a stop to day men doing piece men's work, the piece men walked out in a body. A few days later all thought better of it and wanted to come back. The good men were taken back but the ringleaders were refused. This exhibition of firmness on the part of the management had a decidedly wholesome effect, and from that time on little trouble was experienced in executing the reform.

A halt was called on men putting through bad pieces, by refusing to pay for such. It was also laid down that none should receive castings upon which the previous operation had been improperly performed. This made each man virtually an inspector

on the preceding, showed up defective castings at the earliest moment, and greatly facilitated the work of the general inspector.

The work was specialized as much as possible. One man was given all one kind of castings, another a second, and so on. The day workers were assigned individual benches to break up the huddling, and the work came to them on one side and was taken away on the opposite, moving forward all the time.

Adjustable benches were also provided for the grinders and mechanical handling devices rigged up, to eliminate the heavy lifting and dragging work, and to enable the men each to work at the best height.

A routing system was installed whereby the workmen could take only the work allotted to them, and a ticket in a clip at the machine or bench of each one was the means of informing him what job to do next. It was the foreman's business to see that there was always one job, at least, ahead, and to remove and sign finished tickets.

Adequate lighting fixtures and a dust-collecting system were also installed. Machines were relocated so as to permit passing of work from one to another and to eliminate zig-zagging and back-tracking. The grinders were equipped with three-speed pulleys, to enable the stones to be used down to almost nothing, and, on the basis of tests made in the testing department, geared up to a common speed. One man was appointed to keep the stones trued up and the machines in repair.

The causes, moreover, of excessive grinding were investigated and traced back to the foundry. This resulted in the modification of some patterns and the improvement of foundry conditions, also a considerable stiffening up of the supervision and inspection of the molding and pouring.

Finally, after a number of months of steady effort, in the face of the most trying circumstances, conditions were standardized to the point where it was possible to begin setting piece prices. In the meantime, the room had been entirely reorganized. The incompetent foremen were changed around—one was retained as an operational boss, another made an inspector and two reduced to the ranks. Standard instructions were prepared for the new foremen, and from the day-work records, average unit times and costs determined.

With this past performance information in hand, each operation was taken up in turn and analyzed with the stop-watch. The observer watched and timed an operative until he was positive he had a lead on the best performances and that each operation was being performed in the best way. When he was satisfied the workmen understood the best way, and that he was working at a fairly rapid pace, he established the standard times and set the piece prices.

Each price was so set, making due allowances for necessary interruptions and intervals of rest, that an average worker, once he had become skilled in the operation, could earn $2.50 to $3.00 per day, which was thirty to fifty per cent in advance of the day rates prevalent. In one or two cases, where the day workers had

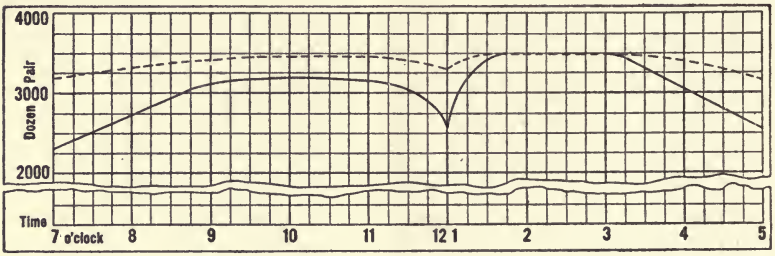


FIGURE XIII: In an emergency which demanded larger output, posting a notice guaranteeing unchanged piece rates and providing good luncheons for the employees increased production in a Philadelphia hosiery mill, as indicated by the dotted curve in this chart. The solid curve shows former output. To guarantee the workers against a cut is all-important

been working at a very slow pace, it was necessary to nurse them along with a bonus for a time, until they got used to working at a higher rate of speed.

In every case, the day rate was guaranteed as a minimum until the man was able on a piece basis to exceed it; and prices set were fully guaranteed for a year with the understanding that, if any marked changes were made in machine or method, reducing appreciably the work on, or the time required to do a piece, the prices were to be readjusted accordingly.

The operational bosses were put on a salary basis and paid enough so that they did not need to defer to pieceworkers on the score of their earning more. The reverse condition was one reason why the old bosses had been unable to control the pieceworkers.

Moreover, the foremen were allowed to share in a bonus for decreasing the percentage of spoilage, and their increase in pay and continuity in service was made contingent on their showing a progressive reduction in the indirect labor and operating expense. The fact that their compensation no longer depended upon the number of hours worked, made them all pushers for getting the work out within regular hours; and this influence alone was sufficient almost immediately to cut out the overtime.

Under the old management, each boss, though he was supposed to instruct and inspect principally, spent most of his time gawking and the rest in checking up work. This condition of affairs was completely reversed. A checker was appointed to tend to the tallying of output exclusively, while the foreman was required to visit each man in turn and at regular intervals throughout the day—in effect, he was given a beat to patrol, just like a policeman or a sentry. It was up to him to see that the work was done properly. As he inspected each piece, he placed a chalk mark on it. The checker then tallied it and cancelled the check mark as he did so. No work could move forward until the double check mark was on it. In this way, the control and credit for output was simply and effectually centered in the operational foreman.

Another foreman—called the production clerk—acted as intermediary between the planning department and the operational foremen, keeping them supplied with work-tickets for their men, following special work and keeping the standard instructions.

Another foreman—the room inspector—was made responsible for the quality, the operational foremen and checkers working under his direction in this respect. No general foreman was needed. If there was contention between the operational foremen, the appeal was to the production superintendent.

As a result of these measures, production was nearly tripled per man and costs reduced one-half. Piece prices were established that are there to stay, and as they are guaranteed, there is nothing to prevent the men from putting forth their best efforts. There is almost an utter absence of late arrivals and early quitters, as is so often the habit with pieceworkers, and as formerly was the case here.

The management credit this success to the fact that the prices are fair and equitable and that they are guaranteed. The less efficient and tractable men have gradually been weeded out, most of them quitting of their own accord, and those of the old

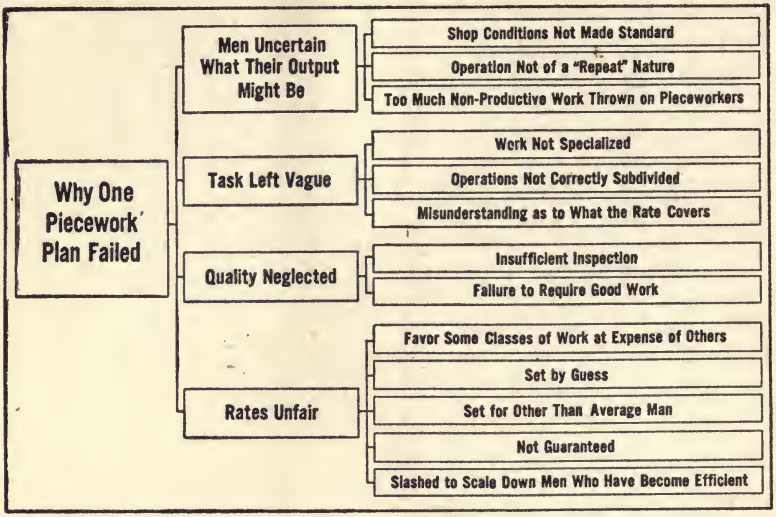


FIGURE XIV: Out of the experience of several plants in getting to the bottom of piecework trouble comes the warning that success depends on observing the fundamentals of fair and guaranteed rates, specified quality, a definite task and steady working conditions. More than any other one thing, it is essential to guarantee the rate for a definite period and to change no rate without conferring with the men. When this warning is heeded, trouble usually disappears

force that remain have parted with their former listless look.

Here is one case where piecework both failed and succeeded, where almost all the conditions that invite a failure in piecework (Figure XIV) were met and corrected. Among these conditions one of the most common is the effort to apply piece rates on the wrong basis; on the pound basis instead of per square foot, as often in metal-working industries; on the board foot instead of the square or lineal foot, in woodworking; on the lineal foot instead of the square foot; or by weight instead of volume.

But perhaps the most frequent complaint urged against the piecework system is that under it quality work is impossible. Nevertheless, it has been found possible, by means of graduated piece rates, to get even better quality (Figure XV).

One manager found that his fastest workers were always his

best workers. And the president of an automobile plant producing a remarkably fine car for the price, has stated: "Quantity production gives quality of output." He was referring to his plant as a whole. But is his statement not equally true of the individual worker? There is a certain point where the two curves—quantity and quality—coincide. This coincidence occurs when a man who knows how to do a thing becomes so interested in doing it that he loses all sense of self in putting forth his best. This attitude of mind in a worker only obtains when conditions are such that he is absolutely unhampered and unharassed in his work, and when the attitude of management is such as to instill the utmost confidence. Where such relations obtain, each worker becomes not only his own *speed boss,* but his own *quality boss* as well.

The plan followed in a leather goods factory, where, in cutting up leather, there was, under day work, considerable waste, which under ordinary piecework would likely have increased all out of bounds, was to set a graduated scale of piece prices—the highest for the lowest percentage of waste; and vice versa. It was not long before automatically everybody was earning the maximum rate and waste was diminished to a degree before believed impossible.

A variation from the ordinary piecework plan is "gang piece-

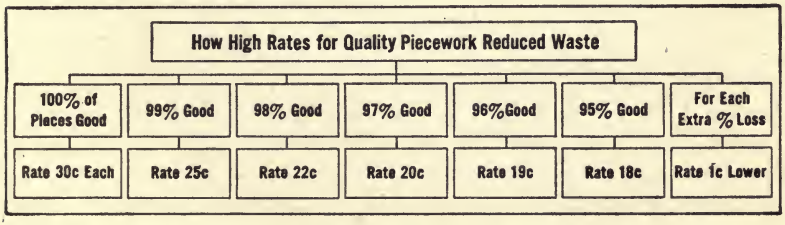


FIGURE XV: By graduating its piece rates as above for quality, an iron-working plant induced one in ten of its workers to make a perfect score and nine in ten to make over 95 per cent good pieces the first month. Within six months, the average loss fell from ten to less than two per cent. Another manufacturer reduced loss to less than four per cent by a similar bonus scale

work," devised to fit operations where two or more men work together. Not only gangs at operations like shoveling, but crews at machines and even whole departments have been put on gang piecework. In the print room in a large print works, where

there were some thirty machines in operation and the operators and their helpers numbered about one hundred and twenty men, the entire room was put on such a basis. The price was fixed on the basis of the average output for the past year in thousands of yards. The men were to share according to their day rates. For every per cent decrease in spoilage they were to receive so much extra per yard. And to induce the head operators to do with as few helpers as possible, each was to receive so much per yard additional for every dollar of helping labor saved.

The results were little short of miraculous. From one hundred and twenty helpers, the number was reduced, in the space of a few weeks, to one hundred, and by the end of the year to sixty. Spoilage sank from more than fifteen per cent to less than five per cent. Output was nearly double. And the earnings of the chief operatives and those of their helpers that remained went up nearly a half. All this was accomplished without forcing on the part of the management and without arousing any antagonism. Every change came about through the initiative of the men themselves.

XV

MAKING MEN PARTNERS IN THE PROFITS

TO establish the employee's loyalty, to secure a permanent force of workers and to give labor the same interest in the welfare of the firm that he himself has, Henry Ford set aside ten million dollars, or one-half of his estimated profits for 1914, to be distributed semi-monthly among his twenty thousand employees. Other employers are also encouraging profit-participation by the workpeople in several different ways. All this is an attempt to find a method that will be a substitute for or will add to the incentive which exists under prevailing labor conditions—the fear of discharge.

The team work which existed between employer and employees in the little business tends to break down with the expansion into a larger business. Friendship for and loyalty to the employer decline and the "just good enough to hold the job" spirit permeates the business enterprise. Does profit sharing meet this difficulty? Does it pay in terms of dollars and cents—and what are the methods where it has proved successful?

Houghton Mifflin Company, publishers, Boston, have in force one of the oldest profit-sharing plans in existence. In explanation of their system, Mr. Mifflin says:

"Our plan, in operation since 1872, is very simple. We maintain a savings department for employees at the Riverside Press (Cambridge, Massachusetts) and agree to pay at least six per cent, but not more than ten per cent, on their deposits. The extra per cent above the six per cent guaranty is paid only on deposits amounting to $100 and not exceeding $1,000. Though no deposits above $1,000 are accepted, interest may accumulate

up to another $600. The additional per cent paid varies with the profits of the business and has ranged from one-half to four per cent. The depositors number about one-third of our eight hundred and eighty employees.

"Has the plan been worth while? Yes. It has stimulated thrift among the employees, has taught many of them the secret of saving and has developed a sense of responsibility on the part of the company as well as the employee. The company, entrusted with the savings of the employees, has been forced into healthy conservatism in its undertakings. The employee, knowing that the rate of interest on his deposits depended on the profits of the business, has performed his work more zealously. The plan has paid, but I would hesitate to say that it could be successfully applied in all instances."

DANGERS TO AVOID IN ESTABLISHING PROFIT-SHARING PLANS

FOURTEEN years after the introduction of the Houghton Mifflin Company system, the N. O. Nelson Manufacturing Company, manufacturers of plumbing fixtures, St. Louis, Missouri, approached the problem of the distribution of profits in a very different manner. The first terms were that after allowing the commercial rate of interest on the net capital, the remainder was divided by equal percentage on the capital and the wages of all employees who had served the company for as much as six months within the year. Some changes in the plan were made later, so that labor received a larger percentage of the profits and in 1904 the customers also were admitted as profit partners. The present plan provides for equal dividends on wages and gross profits on customer's purchases after capital receives six per cent. By the original plan, the dividends to wages varied from ten per cent down to four per cent, and with the present plan the dividend to wages has varied from ten per cent to thirty per cent.

Dividends are paid in the stock of the company and the employees own about one-third, the customers about one-third, and Mr. Nelson the remainder. About one and one-quarter millions capital stock has been issued. There is also a surplus

of about fifty per cent. The town of Leclaire, which was started in 1890 and which now has a population of about eight hundred employees and other people, was built out of the capital.

A suggestion of the dangers in profit sharing which the em-

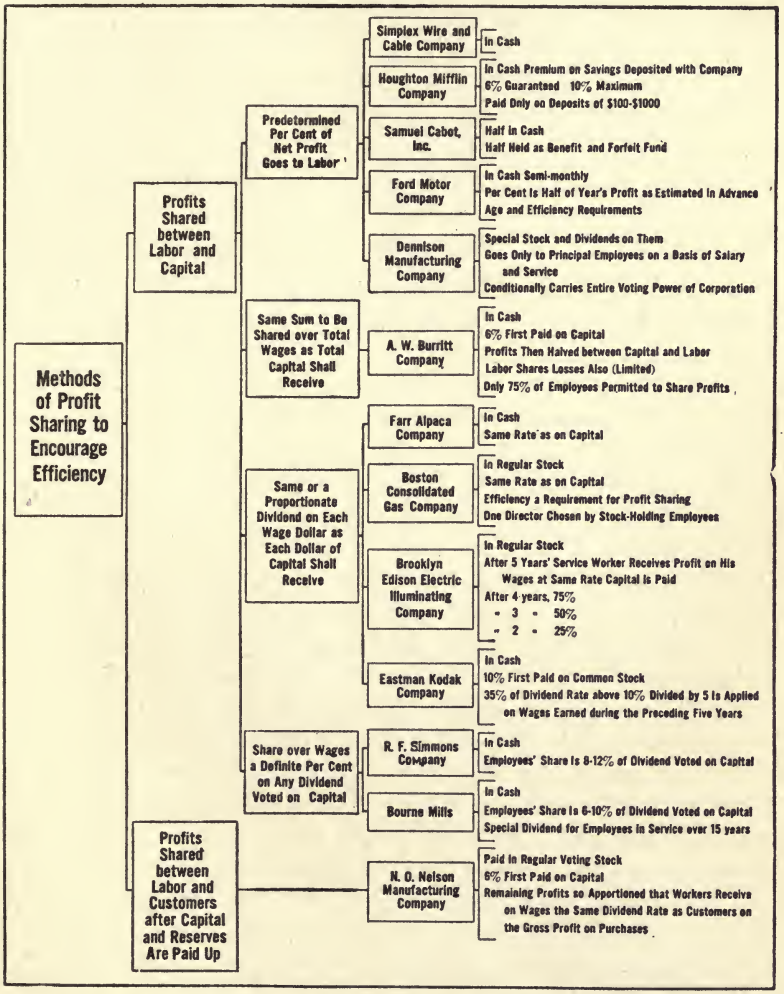


FIGURE XVI: Profit sharing calls for standard wages on the basis of what the employee would otherwise earn and an advance arrangement for distribution of profits such as to assure the worker that no advantage will be taken of him after he has earned the extra profit for his employer. Profit sharing is here analyzed according to its principles, illustrated by the practice of the companies named. The proposal of the Ford Motor Company to rebate to purchasers is based on reaching a certain gross sales figure rather than on netting a certain profit

ployer may avoid is found in the causes for the foregoing success. This Mr. Nelson attributes to the fact that the terms are stated in advance; that the plan applies equally to all regular employees; that it is free from restrictive conditions; that it is sufficiently liberal to make a tangible dividend on wages and that the dividend is paid in stock.

That profit sharing also may be successfully applied in a concern with few employees is illustrated by the experience of Samuel Cabot, chemical manufacturer, Boston. In 1887 Mr. Cabot began sharing profits with twenty-one employees. Today more than three times as many employees are on the profit-sharing roll.

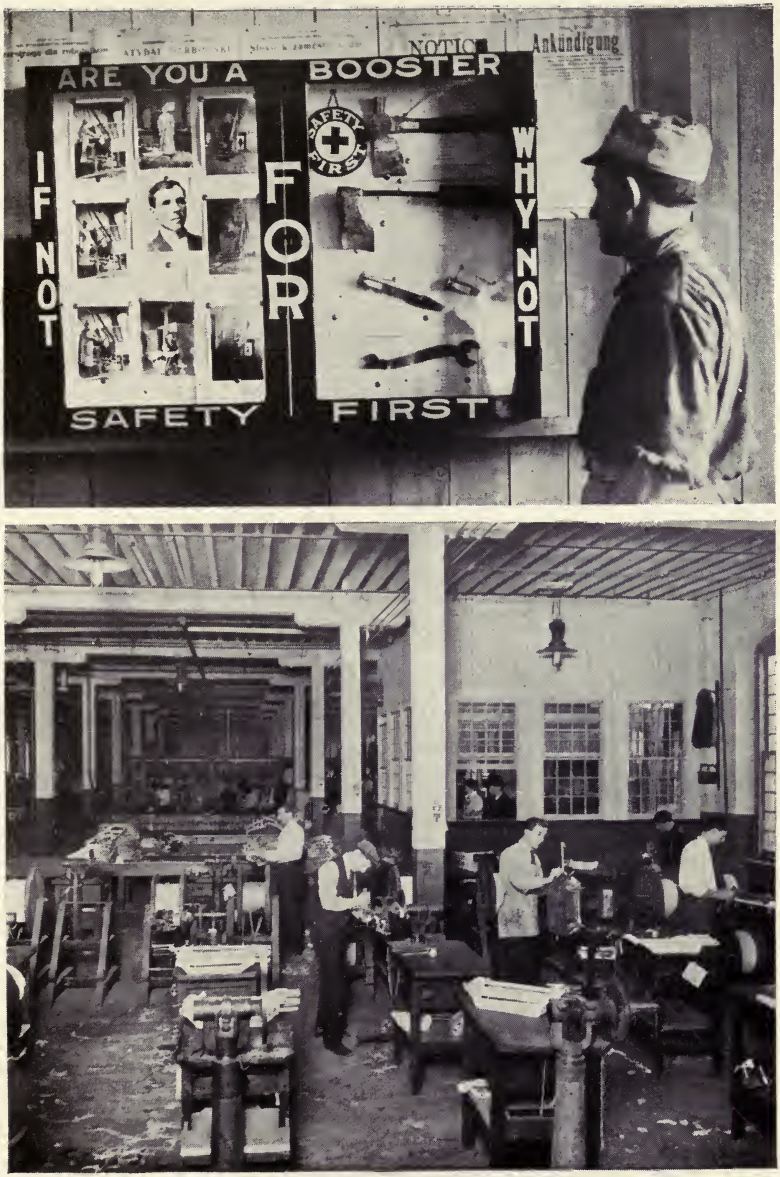
"Every man who enters my employ," says Mr. Cabot, "is given the current rate of wages for such work. If he desires also to participate in the profit sharing he is required to sign a paper in which he promises to do his work as quickly and carefully as possible, remembering that the greater the yield the larger the profits, and to give me sixty days' notice before leaving me.

"On my part, I promise to divide at the expiration of each six months a certain fraction of the profits among the participants, strictly in proportion to the wages of each during that period. This sum in each case is divided into two equal parts, one of which is given in cash to the employee, and the other deposited in a savings bank by me as his trustee.

"This fund in the bank is in the nature of an insurance on the life of the employee and is given over with interest to his executors if he dies. If he should refuse to give me sixty days' notice on leaving me, although he had already received an equal amount in cash on the promise to give me such notice, the money would not come back to me, but would simply be distributed among the other participants at the next division. The same thing is true in case of his discharge for cause."

If the employee, however, resigns while he is in good standing, the deposits with interest are payable to him at the end of two years, provided he has not sold any secret obtained during his employment at the Cabot works. Mr. Cabot may lend the employee money upon the profit fund to build a house.

The same proportion of profit has been paid to the employees each year, and while the first payments averaged about ten per



Accident prevention is chiefly education. Safety can be advertised in many ways, some of which are evident in the picture at the top—bulletins in all languages, examples of defective tools that made trouble, photographs of situations that peril workmen. Below is shown a shop foreman's office placed and constructed for convenience and to give the executive full control

Not only has the progressive plant a department for maintaining its workmen in prime condition, but it also looks after "repairs." A stretcher and emergency outfit (above) in use by the Dodge Manufacturing Company is especially efficient because of the ease with which it can be adjusted. Below is shown a ward at the Worcester Corset Company's plant

cent upon wages, they have increased gradually until in some years they have exceeded twenty per cent. The average wages have also advanced as the efficiency and skill have increased.

"If we can draw any inferences from these facts," says Mr. Cabot, "it is that inasmuch as my profit compared to the wages paid has increased, the efficiency of my workmen has improved."

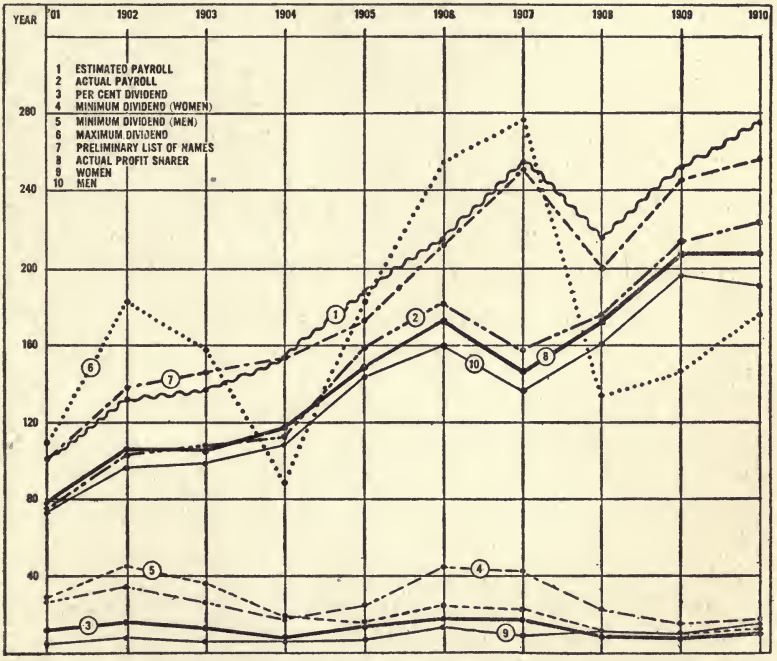


FIGURE XVII: This is a graphic history of ten years of profit sharing at the Simplex Wire & Cable Company. Lines 1 and 2 show how the total payroll of the actual profit sharers compares in dollars with the payroll estimated at the beginning of the profit-sharing period, the total of the then rate of the weekly wages of those placed on the preliminary list multiplied by 52; line 3 indicates the per cent of dividend paid to profit-sharing employees in proportion to their wages; lines 4 to 6 give the dividend in dollars; lines 7 and 8 show how the conditions laid down for profit sharing reduced the preliminary list; all other lines refer to the number of employees sharing in profits

The Bourne Mills, cotton manufactory, of Fall River, Massachusetts, is another firm which has led the way in the profit-sharing movement in this country. Semi-annually since July 1, 1889, it has admitted its employees to a share of the profits.

Every employee who has served six months and worked faithfully during that time receives a share of the profits in proportion to the dividend paid to the stockholders. A sum amount-

ing to not less than six per cent nor more than ten per cent of the dividend on capital is divided by the total wages which the employees earn in six months. Each workman eligible to participate in the profits gets a share based on the proportion which his wages bear to the total amount paid out in wages to all employees. The dividend has ranged from two to seven per cent on wages annually. The semi-annual dividend in July, 1904, amounted to four per cent. The increase was due to the fact that several of the employees dropped out on account of the weavers' strike. Approximately ten per cent of the total profits has been given to labor. A special dividend of forty per cent of the original amount set aside for employees is paid to those who have been in the employ of the company continuously over fifteen years. The mills now have 716 hands on their payroll, 576 of whom shared in the profits in 1913.

LAYING DOWN A SOUND FOUNDATION FOR A PROFIT-SHARING SCHEME

FOUR different variations of profit sharing tested by years of experience and found successful have been outlined above. While these plans differ in many particulars, there are certain fundamentals which are evident in all—the outlines upon which any scheme of profit sharing may be reared.

In the first place, the employers do the unexpected. The share to be distributed is determined not at the end of the profit-sharing period but in advance. The per cent of profit shared need not be announced. The employee can tell whether the plan pays by the amount of his dividends which he receives from year to year.

Figure XVI shows the principal forms of profit sharing. They can readily be adapted to particular conditions. The Ford plan is a profit-sharing system only in so far as the amount to be distributed to the employees as their share of the profits is a fixed per cent of the estimated profits, and hence varies with the efficiency of the employees from year to year. Generally the profit-sharing firms divide the labor share of the profits among the employees in the proportion which the wage of each employee bears to the total wages paid.

There is sometimes an inclination to consider the wage dividend a gift to employees. The foregoing plans, however, were introduced with a definite insistence on the thought that the extra remuneration must be earned. Profit sharing is not charity. Its economic justification lies in the fact that the employee applies himself more diligently; exercises the greatest care in the use of tools, supplies and materials; increases the output directly through his own efforts and indirectly through encouraging group efficiency among the other workers; and discovers new sources of profit.

Furthermore, the line of least resistance dictates stationary wages. In the plans examined, however, the fact that the employees' share of the profits did not become a substitute for an increase in wages was emphasized.

In short, profit sharing under which the wage earner receives in addition to standard wages a share of the profits determined in advance, promises to meet with success. Yet profit sharing has not earned unqualified approval. Though many employers have found the system profitable, others have reached an adverse conclusion. Many of the failures, however, have been due to brevity of trial. Often at least six or eight years are necessary for a thorough test of profit sharing. The plan must win the confidence of the employee if it is to be a success (Figure XVII).

Nor is profit sharing applicable in all instances. No direct financial return can be expected by those firms whose employees are already working at their maximum efficiency. On the other hand, conditions are favorable for profit sharing in those establishments in which the profit is considerably and directly influenced by the manner in which the employees do their work; where the greater fidelity and increased efforts of the employees continue after the initial impetus which the variation in the wage system awakens has passed; where the employer regularly gives them an appreciable share of the accruing gains; and where the experience of successful firms is followed. The degree of success will vary in a large measure with the personality of the employer. If he is able and high-minded, unusual results may be accomplished.

XVI

WINNING MEN TO A NEW WAGE PLAN

SHOP habits are flywheels on methods. A too sudden deviation from the usual may bring a crash. Changes from day work to piece or premium rates and from contract to direct payment are among the most difficult tests of managership. How to go about such a shift when the necessity arises, and persuade the men to change their minds as well as their methods is strikingly shown by the two-fold experience of a plant where the transitions respectively from day work to piece rates and from contract payment to gang piecework have been handled successfully in the face of extraordinary difficulties.

The plant was a New England copper-alloy mill. Upon the death of the old man of the business, several superintendents had been tried in his place, but none had been able to bring all minds into alignment and common purpose. To solve the situation, efficiency engineers had finally been called in.

From the outset the greatest opposition confronted the engineers. By the workmen they were regarded with sullen hostility and by the foreman with skepticism and reluctant cooperation. Information was exceedingly hard to get and the initial efforts made to secure reliable statistics everywhere met determined opposition. Realizing the value of an object-lesson, the engineers finally won by concentrating on and changing the payment method for one operation which lent itself peculiarly to special study because it was not directly dependent upon any other part of the process.

This was the operation known in the shop as "cabbaging"

and consists in making up into closely compacted cylinders, by the aid of a hydraulic press, the tangled and matted scrap accumulated in the plant and bought back from customers. Each cylinder weighs twenty-five to thirty pounds and is of a size and shape neatly to fit into a crucible for remelting.

A gang of three men, with a working overseer, was engaged in this work. They worked leisurely, let the scrap pile up around them and spread a behind-hand tendency throughout the mill.

A start was made by having the cabbages regularly weighed and recorded. For twelve weeks there was no further attempt to right conditions, except to make a few physical changes, and to arrange for the systematic removal and weighing of each day's production by independent forces.

Some time studies were also made and enormous opportunities revealed for eliminating lost time and motion. But the workmen gave no whole-hearted conformance to the resulting instructions.

The twelve weeks' records showed an average weekly production of 23,500 pounds. The cost per pound, on the basis of three men at a dollar and a half a day, figured eleven cents; including the supervisor, at two dollars a day, the cost was seventeen cents. Time study indicated that a production of fifty thousand pounds a week easily was possible and that a fair piece price for the work, on the basis of four men, would be ten cents a hundred pounds and seven cents a hundred counting only the three men actually engaged in operating the machine. A price of eleven cents was fixed, however, and the men were called into the superintendent's office and the matter explained to them. They were assured that the price was based upon their ability to earn a dollar seventy-five cents a day if they worked faithfully, and that two dollars or more was entirely possible. Their previous day wage was guaranteed to them as a minimum. On this basis they announced their willingness to go ahead.

At the end of the first week on piecework the production jumped to 39,400 pounds. The men, all of them, had worked with a will and a vim and did their honest best, but to keep up heart constant sympathetic attention was required from the

efficiency engineer. The rest of the shop to a man were hostile and tried at every opportunity to discourage the beginning piece-workers.

At eleven cents a hundred pounds the total pay of the gang for the first week was $43.34. This divided in the ratio of their day rating gave to each of the dollar-and-a-half men an even ten dollars, or one dollar in excess of their former weekly earnings, and to the two-dollar overseer $13.33, or $1.33 in excess of his usual pay. So on the very first trial the new plan seemingly was a success.

But the men were not satisfied. They had expected to earn at least $1.75 a day, or $10.50 for the week, and Monday morning found them in the superintendent's office in a rebellious mood. Their complaint was not that the price was too low, but that the working overseer was getting a share of the proceeds to which they felt he was not entitled, and they refused to go back to work unless he were dissociated from the gang; all of which is interesting as it shows how gang piecework operates automatically to eliminate loafers and useless supervision.

When the overseer was directed to occupy himself with the supply and removal of the scrap, however, and the men found that, by the exclusion of his wages, the rate was lowered to eight cents per hundred pounds, it took considerable argument to get them back to work.

The second week they worked with manifestly less spirit than before, and produced only 30,800 pounds, a decrease of 22%. Their total earnings, on the basis of eight cents a hundred, thus, were $24.64, or only $8.21 each. By the terms of the agreement each received nine dollars—his regular weekly wage. They were shown that if they had maintained their first week's production, they each would have earned $10.53, so that actually their piece rate had been raised.

Output the third week rose to thirty-five thousand pounds. This was still short of the first week's record, but better by 13.6 per cent than in the second week. Their individual pay was $9.33, or only thirty-three cents above the ordinary amount.

Upon receipt of their pay envelopes, without further parley the gang struck and one of them the same night packed up and

left town. The other two were persuaded by the engineer to return. So the fourth week started with two old men and one new man and everything went smoothly. The production was only slightly greater than the preceding week, or 35,200 pounds, but this was chiefly due to the inexperience of the new man.

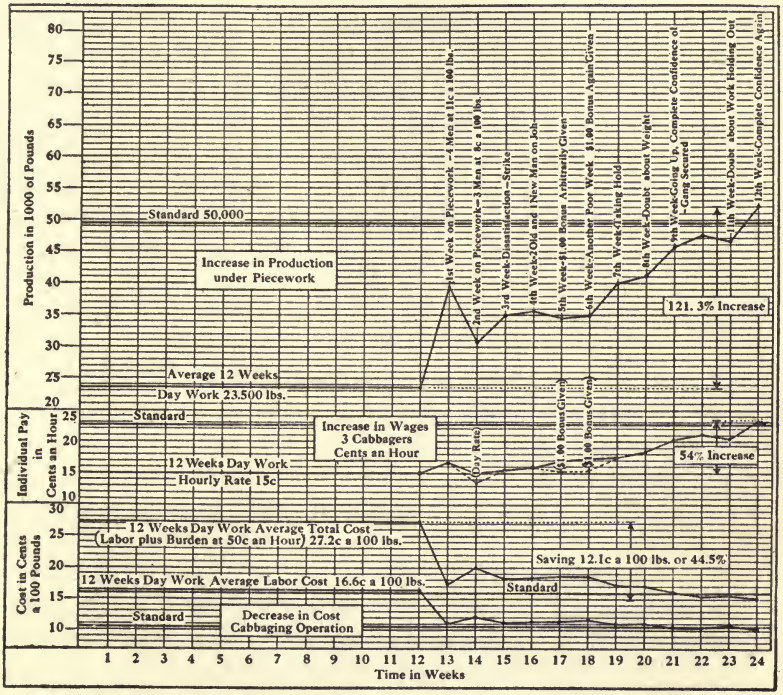


FIGURE XVIII: A three-fold analysis is here given of the reorganization work by which efficiency men put the cabbaging gang in a copper mill on piecework. Beginning with the twelfth week, the fluctuation of production (at the top), of individual pay and of costs are traced in detail to the point where the change became established

The superintendent was averse to taking the strikers back, but the engineer insisted that their rebellion was due to misunderstanding more than anything else and that real victory, so far as the effect on the shop opinion was concerned, lay in making the scheme a success with the original men.

The fifth week, contrary to expectations, production, instead of increasing, sank slightly, to 34,450 pounds. The superintendent proposed raising the piece price. "It is too low," he

had argued from the start, and now he felt sure of it. The engineer, however, with entire faith in his time studies, refused to consent to a change. But realizing that a crisis had been reached, he ordered an arbitrary bonus of one dollar each to be given the men.

This acted like a tonic. But adverse conditions made the bonus again necessary and only in the seventh week did results begin to show. Production ran up to forty thousand pounds, a new high mark, and the earnings of the three, without any gift, amounted to ten dollars and seventy cents, which was greater by forty cents than the highest preceding pay.

During this week the leader of the gang came to the engineer and said they wanted to weigh their own cabbages. Given every assistance in so doing, a day or two convinced them that the time so spent was wasted. They were at last satisfied that they were being given a square deal.

Production inevitably showed a substantial increase each week thereafter (Figure XVIII), and by the end of the twelfth week it had attained the rare good mark of fifty-two thousand pounds, or more than twice the average weekly output on the old day basis. This was close to the standard predetermined by the engineer, and the correctness thereof was demonstrated by the fact that this level was maintained permanently. Individual earnings the twelfth week were $13.87 each, or $2.32 a day. Thus their fondest expectations of two dollars a day were not only realized but considerably exceeded; and a leverage was secured upon the confidence of the entire force in the efficiency and piecework program.

HOW A BRASS MILL OBTAINED "A FAIR DAY'S WORK FOR A FAIR DAY'S PAY"

MOST of the departments in this plant were still on straight day work after thirty years' operation. A few had been put on piecework. But the casting work, which it had not been thought practicable to handle on either a day or a piecework basis, had been contracted out. And the contractors were handling their work in a manner which gave little cause for complaint. The fact that the management was paying them a price for casting considerably in advance of what other mills in the

valley were paying for the same work was for a long time overlooked on the score of superior quality.

Singularly enough, however, as years went on, the trade showed less and less appreciation for the reputed superior quality of this mill's product; and the management was forced to acknowledge that it was paying too much for its casting. How to cut the price without offending the contractors and without endangering the quality became a problem which caused the manager finally to call in an efficiency engineer.

"If we were rigged up here like some of the shops we compete with, we would be able to turn out twice as many castings in the same time, and better quality at that," the touchy head caster admitted, after the engineer had approached him tactfully.

"Well, I'll see what the management is willing to do about it," said the engineer. "First, however, with your recommendations in mind, I am going to prepare a plan and I want you to go all over it with me before I submit it to the 'old man.' "

A plan for modernizing the castings shop was duly prepared with the help of the caster, submitted to the management, approved, and put through. Production, naturally enough, increased. No longer was the mill kept waiting for metal. The casters began to finish their shifts ten, twenty, thirty, then a full sixty minutes earlier than heretofore.

In the meantime the engineer had installed a scale in the passageway between the casting shops and the rolling mill, and was having every truck load of metal weighed as it went through. Here he met his first opposition. In order to get weights that were reliable and useful for the purpose he had in mind, it was necessary for the bars to be piled on the trucks in certain classifications. The casters had been in the habit of piling them on haphazard. Shortly, however, he gained his point, but cooperation was reluctantly given, for the casters felt that something was in the wind.

This data he had the cost department regularly compile by pay-periods, thrown against the money paid the casters for the work represented, so that a cost per pound of good casting (deducting for gates and bad bars) was brought out. Great irregularity was disclosed in the cost of castings per pound by different casters and by the same casters at different times. But one con-

clusion was possible; namely, that the management, in paying for its casting work by the pot (or crucible), rather than by the pound of good casting, was regularly defrauding itself out of hundreds of dollars. This was because there was such a great variation in the size of molds.

The engineer saw his opportunity in this situation. His first step was to calibrate the crucibles. This gave him his maximum volume. His next step was to determine the specific gravities of the various principal alloys of brass regularly melted here. He corrected his figures by test to allow for shrinkage in pouring and then proceeded to standardize the various molds in accordance with the capacity of the crucibles. Some he found he could lengthen only an inch, others, two or three inches; still others half a foot or more. The figures were so attractive that the head caster could only agree to the changes.

When the new molds were installed the benefit showed immediately in the unit costs, which on the whole, of course, now averaged considerably lower, to the management's clear gain. Also the irregularities were considerably smoothed out, and what remained pointed the way unmistakably to the need for a readjustment of prices all along the line.

Before passing any snap judgment, however, on the indications of the irregularities, the engineer proceeded to have some time studies made as to the times required to melt different alloys. As he had surmised, some alloys, which had higher melting points than others, did require a longer time to melt; and some, too, were much more difficult to handle than others, requiring more skill and pains, hence more time. Nevertheless, many of the irregularities pointed to unwarranted inequalities in the pricing.

With his time studies as a basis, therefore, he proceeded to draw up a new scale of prices, based not on the pot as were the old ones, but on the pound of good metal cast; and with this information in hand he was ready to take the final step, which was to do away with the contract system and place the entire casting shops on a gang piecework basis.

He had now reached the crisis in his development work. A false move at this juncture he knew would be fatal. Things were working, however, to aid him. He had been busy the while making friends with all the boys in the shop, and some of the

under-casters, who were being paid on a piece basis by the head casters, he found were much disgruntled with conditions. They resented a middleman between them and the management, who was creaming off the profit on their production. Several of these under-casters, the engineer found, too, were fully as ex-

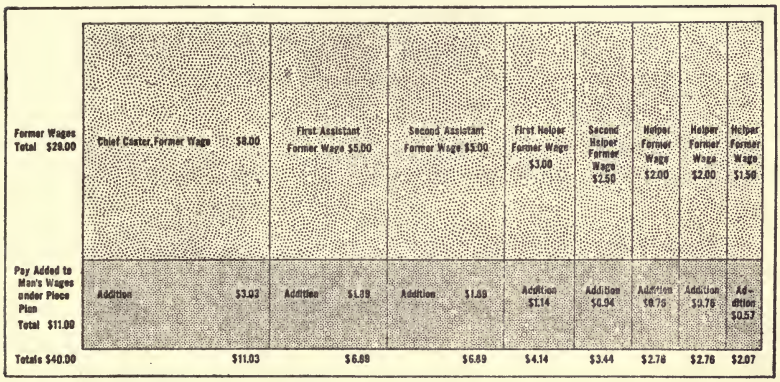


FIGURE XIX: The total shaded area represents one day's piecework pay of the gang of casters who were put on gang piecework in a brass mill as described in the text. Each oblong represents by its area the day wage, or bonus proportional to that wage, of one man, and the two shaded areas show graphically the ratio of total bonus to total wage

pert as the men under whom they worked. The one head caster, with whom he had had so many dealings, however, he felt was too valuable a man to lose. Just such a man as he was needed to take general supervision of the three casting shops. He therefore had this man called into conference with the manager. The new plan of gang piecework based on the pound of good castings, with his own promotion under a salary and a bonus for department economies, was tactfully outlined to the caster, who at length agreed.

Having won the chief possible contender over to its side, the management had little difficulty in winning over the rest of the head casters and the men under them to the new plan. Not one quit. Consequently, the final readjustment was accomplished quickly and smoothly. The scheme of payment was to divide the earnings of the gang pro rata their former wages (Figure XIX).

And as it actually worked out, although the piece prices set

were on the average not more than half the unit costs on the old basis, even after the molds had been changed, so greatly was production stimulated by the new arrangement and so thoroughly was the "water" squeezed out, that the men's earnings on the whole averaged in proportion one-fourth to one-third higher, with a shorter day, and better working conditions. The gain to the management was much greater, of course.

And so it is in many instances. Outwardly the chief problem generally seems to be one of wages. The management can only think of reducing wages. The workmen, whose standard of wages in all probability has by no means kept pace with the increasing cost of living, are looking for an increase, not a decrease in wages. But the real problem is not a matter of mere wages but of production and evolving a payment system which insures a "fair day's work for a fair day's pay."

XVII

TIMEKEEPING AND PAYROLL METHODS

WORKMEN in a store fixtures factory, as they reach their benches morning and noon, press electric buttons which indicate upon an annunciator in the timekeeper's office that numbers 53, 59, 62 and so on are beginning work. The timekeeper or his assistant records the number and time. When an operator finishes a job, he again presses the nearby button and marks the number of the job on a slate hanging above his bench. The assistant timekeeper makes occasional rounds and takes off the numbers.

In a gown alteration shop, the telephone takes the place of the electric button and timekeeper's trips. From each department there is telephoned an immediate report when any worker changes jobs.

The tendency in timekeeping systems, as well indicated in these advanced methods, is to get rid of the workman's pencil and so to simplify his part of the record keeping, whether by time-clocks, foremen's punches, time books, checks or the electric systems mentioned, as to minimize unproductive time. This chapter will discuss several—but not all—timekeeping systems.

Timekeeping has three objects: (1) to make sure that labor is being applied to the investment in capital and in overhead as nearly full time as possible; (2) to determine the earnings of the workman and give a check upon the value he delivers; (3) to furnish a basis for labor costs. Every efficient time system must, therefore, determine the wage due by checking time worked and work delivered; permit quick and accurate calculation of the payroll, get the money to the men directly, and leave the essen-

tial cost and financial records. Loose methods must be avoided, so that workmen will not be tempted to "beat the clock."

Rightly placed and used, the time-clock has proved effective in checking on attendance and keeping down tardiness. In a small specialty factory, the time-clock is placed in the front of the office to one side of the shop entrance. On either side is a filing case for the time cards. En route to their work, the men take their cards from one case, stamp the time at the clock and deposit them in the second case. A similar operation takes place going and coming at noon and at night. The men also fill out work tickets indicating the time put on each job. These tickets the timekeeper, sitting in an office facing the clock, hands to the men as they pass. The foreman assigns the jobs and O. K.'s the slips as each task is completed. In the evening the men on passing out return their slips to the timekeeper, who checks them with the clock cards to prevent "padding." Each pay day the used cards are gathered and new ones issued.

In several large factories, the various time-clocks are electrically regulated by a master clock located in an office away from the dust, dirt and vibration of the shops. At strategic points, time stamps regulated by this clock are conveniently located for the use of workmen in stamping their work tickets throughout the day. Another use of the time-clock is to place it on the shop door. Each employee carries an individual key which records his entrance time.

CHECK SYSTEMS AND TIME CARDS THAT SHOW ATTENDANCE AND TIME LOST IN TARDINESS

PASS checks of many sorts have proved satisfactory in various plants. With the Michigan Stove Company, each workman has a brass check bearing his number. As he enters, he takes his check from a rack alongside the superintendent's office. Passing to his department, he hangs his check on another rack, which is provided with a glass panelled door and a spring lock. Promptly at five minutes past the hour the department racks are locked. The foreman can then see the "late" situation at a glance. At the blast of the whistle, the general cabinet is also locked. Workmen who are late must see the superintendent's timekeeper in order to get their checks. On his records, the workman is "docked"

to the next half hour. Reaching his department, the late arrival must also hunt up his foreman in order to deliver his check and be started at work. The foreman makes note of this time and thus checks on the timekeeper's record. This prevents loafing between the two checking operations.

Foremen also receive checks on coming in, but their rack is inside the superintendent's office and their checks are on the rings of keys which they hang up at quitting time.

Duplicate check systems are in use at many plants. In one concern three checks are made for every member. Each employee is given one, known as his identification check. On the board at the main entrance is the second check. The incoming workmen show the attendant their identification checks. He thereupon removes the corresponding checks from the "out" board and tosses them into a box, later to be hung on the "in" board. The checks remaining on the out board at whistle time are listed on the time record. By a similar process, the foreman or his assistant shifts the third check when the workman reaches his department, and the record of tardiness there comes in as a check for the timekeeper. Late slips and passes are used for entrance and exit during hours.

CLOCK NO.	ASSEMBLING		ORDER NO. D	
NAME		PUTTING UP BRS.	REPAIRING	
QUANTITY	DESCRIPTION OF ARTICLE	PUTTING UP MRS.	CUTTING	
		CLEANING BRS.	SCORING	
		WRAPPING	NAILING	
		BOXING	STAYING	
		BURNISHING	LINING	
		PAINTING	INSPECTING	
		CEMENTING	WASHING	
		BUNDLING	CLEANING ROOM	
OPERATION PERFORMED		LABELING	GENERAL	

6	½	7	½	8	½	9	½	10	½	11	½	12
12	½	1	½	2	½	3	½	4	½	5	½	6

APPROVED	RATE PER	HRS.	MINS.	VALUE

FORM XXXI: By having the operations in each department classified and printed with the hour and half-hour schedule, the foremen at the Florence Manufacturing Company, with a hand punch, are enabled quickly to apportion time on jobs, and make an unerasable record

In another plant, each employee uses two numbered checks which the doorkeeper gives out every morning. The workman

goes to the first, second, third or fourth floor of the building at morning and at noon, and deposits one or the other check in a slot from which it drops to the timekeeper's office. Checks for those employed on each floor are larger than those for the floor below, and require a larger slot. The baskets into which the checks fall are unobtrusively changed when the whistle sounds.

Under scientific management, a similar plan is used with work tickets. At each shop entrance is a numbered compartment for individual assignment cards. This cabinet the clerk locks at whistle time. Tardy men must report at the office to get their assignments. All records are turned in every night.

At the Clothcraft Shops in Cleveland, brass pins are used instead of checks. During hours, the worker wears his pin on his left bosom. At quitting time he hangs it on a hook in a cabinet in his department. At the beginning whistle, the operatives line up at their respective cabinets and file by, taking their pins. Five minutes later, when the second whistle sounds.

WEEKLY INDIRECT LABOR TIME TICKET

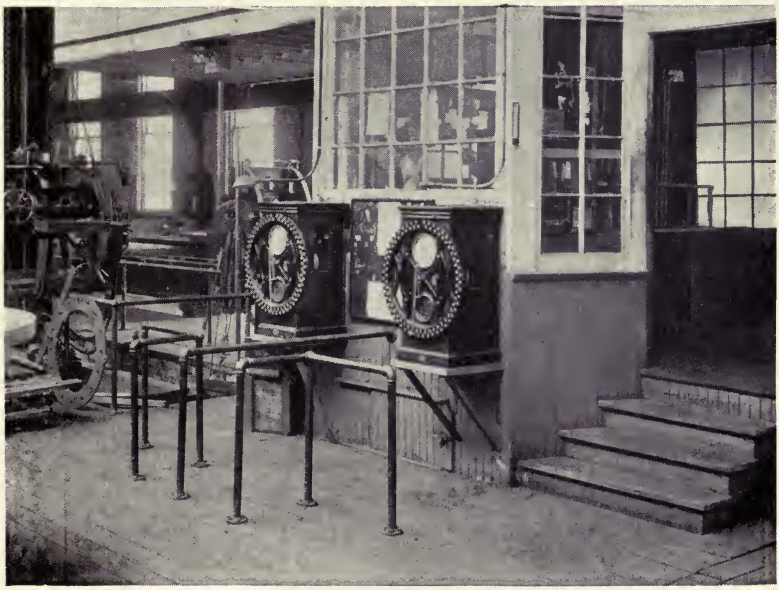
WEEK ENDING _____ 191__

DAY OF WEEK	DESCRIPTION OF WORK	ORDER NO.		FROM		TO		ACTUAL TIME WORKED		OVERTIME ALLOWED		MEETINGS		BATH	COSTS	
				HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES	HOURS	MINUTES	MIN.	DOL.	CTS.
MON.			A. M.													
			P. M.													
TUE.			A. M.													
			P. M.													
WED.			A. M.													
			P. M.													
THU.			A. M.													
			P. M.													
FRI.			A. M.													
			P. M.													
SAT.			A. M.													
			P. M.													
EMPLOYEE'S NAME						TOTAL TIME									GRAND TOTALS	
DEPARTMENT		CHECK NO.		RATE		TOTAL EARNINGS										

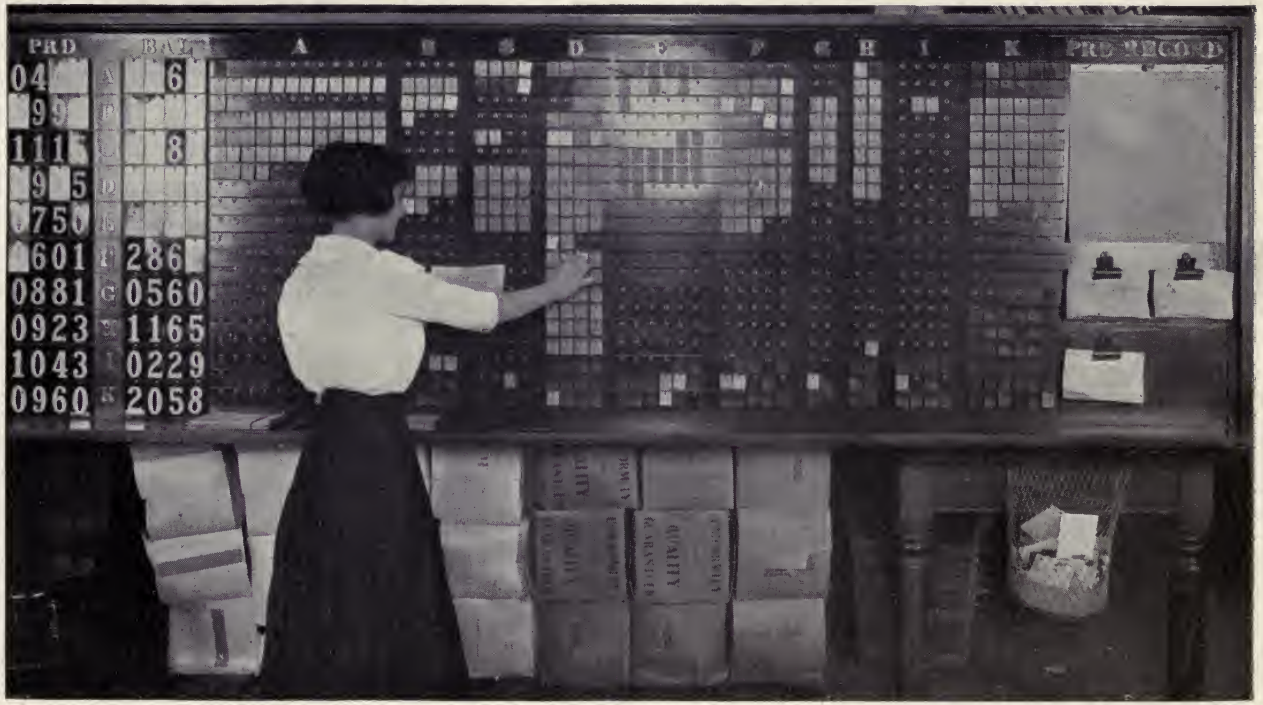
FORM XXXII: Daily time cards are the rule in most plants. This time ticket takes care of indirect labor time for an entire week and thus simplifies the timekeeper's work in the foundry where it is used. Special columns indicate that time is allowed the men to attend shop meetings and for baths during their day's work

everyone is at his station. Night and morning the supervisor closes the cabinet. During hours, only the timekeeper with his special pass key may open it.

At the same moment, the timekeeper starts a circuit of the departments gathering all remaining pins in an especially



Two methods of timekeeping are the clock-and-card plan, under which each workman stamps his time on his card and shifts it to the other rack, and the system which requires that he simply punch his number at the time clock. Under both plans other precautions are necessary absolutely to prevent one employee from checking in for another



Quantity of work done and balance to be done are posted up to the minute on a record board in full view of the workers at the Joseph & Feiss plant. Loose digits, in white and black, are hung on a metal background. Under A, B, C, etc., are the records of the sections thus lettered. Orders are followed by means of tags; yellow for regular orders; red, special; blue, rush. Total production and balance appear at the left and weekly records for the year at the right

constructed tray. On reaching the office he finds any "tardies" lined up under the eye of the service superintendent. After making his records, he gives out the pins to the tardies, who then report for work. Rarely, however, out of nearly one thousand in the plant, is a single person late a minute. Pins not called for

AMOSKEAG MANUFACTURING COMPANY

DESCRIPTION OF WORK

REAMING, TURNING AND FINISHING SPEEDER BOLSTERS

PAYMENT ENDING	TIME	PRODUCTION			EARNED		TIME
	HOURS	REQUIRED	ACTUAL	GAIN	PER HOUR	PER PIECE	PER PIECE

WORKMAN'S NAME _____

_____ PAY $ _____

PRODUCTION RATE PER PIECE _____

BONUS RATE 50% _____

FOREMAN'S SIGNATURE _____

OUTPUT INCREASED _____

EARNINGS INCREASED _____

COST REDUCED _____

CONTRACT MADE _____

CONTRACT EXPIRED _____

FORM XXXIII: The bonuses for the foreman and sub-foreman are determined from the data which is collected on the card here shown. In the shop where this card was used a workman increased his output 50 per cent, added a bonus of $2.50 to his regular wage and lowered the labor cost of the part he handled from twenty cents each to sixteen and two-thirds cents

by tardies represent absentees and are hung up in the office in three cabinets, designating different periods of non-attendance. Absentees must also interview the service superintendent. When an operator definitely leaves, his pin is transferred to a fourth cabinet to be reissued. A glance at these cabinets apprises the manager of any serious difficulty with attendance.

A concern with an outside work gang provides individual tickets which are punched at the door and by the foremen throughout the day. The tickets are divided into five-minute intervals. The Florence Manufacturing Company uses a similar punch system to keep indirect, direct and piecework time. The cards (Form XXXI) are printed in lots of fifty for each man, carrying his name and number. The foreman date-stamps the card and with his punch checks the operation, his approval and the time. He has no writing to do. Each foreman has a dis-

tinctive punch and thus makes a record that cannot be changed. A card is used for every job and the total cards filed under one man's name are the basis for paying at the end of the week.

Reducing "lates" is usually a matter of diplomacy as well as one of timekeeping. Upon the recommendation of a committee of the ordinary employees, the Simplex Electric Company management goes over the tardiness records with each foreman monthly and holds him responsible for discipline in his department. The result has been a reduction of "lates" from thirty-five to one or two per cent of the employees.

CHECKING UP ON THE AMOUNT OF DAY WORK DONE

ON day work, time tickets additional to the plans for checking in and out are important for their bearing on labor costs and their ability to show the efficiency of the workmen. Where payment is made by the piece or includes a bonus and requires checking against work standards, with subtraction for errors, a simple but accurate record of work is essential (Forms XXXII and XXXIII).

Daily Time Note

Name _____ Date _____ 191__

No. _____ Rate _____

Order No.	Good Pieces	Patt (No.)	Art. (L)	Part (No.)	Piecework		Operation		Helper's No.	Time			Day Work Amount	
					Price	Amount	No.	Description	R–	Start	Fin.	Elapsed	Prod.	Non-Prod.
Ent. PR.		Ent. Costs			Tot.		O. K. _____ Foreman				Tot.			

FORM XXXIV: Both piece and day work in all departments are taken care of on this simple daily time note in use in a small woodworking factory

In the Manila Bureau of Printing a time ticket (Form XXXV) has been worked out, the simplicity of which enables one clerk to abstract the daily time of about two hundred printers. Upon beginning work, the operator enters the order number and the operation number in their respective columns. A yellow form printed in green is used for overtime.

WORKMAN'S DAILY TIME TICKET

I CERTIFY ON MY OFFICIAL OATH THAT THE TIME NOTED ON THIS TICKET IS CORRECT

BINDERY DIVISION

REGULAR TIME

DATE _____

RATE OF PAY _____ NAME _____

CRAFTSMAN. JUNIOR CRAFTSMAN. APPRENTICE. HELPER.

A. M.

WORK ORDER NUMBER	TIME	PART	SPECIALTY NUMBER; ALSO QUANTITY WHEN ORDERED	OFFICE USE HAND	OFFICE USE MACH.
	6.00				
	6.06	1			
	6.12	2			

P. M.

WORK ORDER NUMBER	TIME	PART	SPECIALTY NUMBER; ALSO QUANTITY WHEN ORDERED	OFFICE USE HAND	OFFICE USE MACH.
	1.00				
	1.06	41			
	1.12	42			
	1.18	43			
	1.24	44			
	1.30	45			
	1.36	46			
	1.42	47			
	1.48	48			
	1.54	49			
	2.00	50			
	2.06	51			
	2.12	52			
	2.18	53			
	2.24	54			
	2.30	55			
	2.36	56			
	2.42	57			
	2.48	58			
	2.54	59			
	3.00	60			
	3.06	61			
	3.12	62			
	3.18	63			
	3.24	64			
	3.30	65			
	3.36	66			
	3.42	67			
	3.48	68			
	3.54	69			
	4.00	70			

FRIDAY SHOP E 1558

BUTTONHOLES IN LAPEL SOFT ROLL 2ND BUTTON

D.S. 1/4 3/8 1/2 LAP SEAMS 1/4 3/8 1/2 SS 1/16 1/8 1/4

STYLE SILK NO

1	5	9	13	17	21	25
2	6	10	14	18	22	26
3	7	11	15	19	23	
4	8	12	16	20	24	

26 BRUSHER	E 1558	25 OFF PRESSER	E 1558
24 BASTING PULLER	E 1558	23 BUTTONHOLE MAKER	E 1558
22 EDGE STITCHER	E 1558	21 FINISHER	E 1558
20 COLLAR MAKER	E 1558	19 COLLAR SEWER	E 1558
18 COLLAR SHAPER	E 1558	17 COLLAR PRESSER	E 1558
16 ARMHOLE BASTER	E 1558	15 ARMHOLE PRESSER	E 1558
14 SHO. AND SLEEVE SEWER	E 1558	13 LIN. BASTER	E 1558
12 EDGE BASTER	E 1558	11 SLEEVE AND TAPE PRESSER	E 1558
10 TAPER	E 1558	9 1ST BASTER	E 1558
8 SHAPER	E 1558	7 CAN. BASTER	E 1558
6 POC. AND SEAM PRESSER	E 1558	5 POC. AND COL. MAKER	E 1558
4 CAN. AND LIN. PRESSER	E 1558	3 LIN. MKR.	E 1558
2 SLEEVE MKR.	E 1558	1 TRIMMER	E 1558

O. K. _____

FOR THE FOREMAN

ACCURATE TIME MUST BE KEPT

(SEE OTHER SIDE FOR NUMBERED SPECIALTIES AND INSTRUCTIONS)

FORMS XXXV and XXXVI: With the larger form, in use at the Manila Bureau of Printing, the workman's time entries are simplified. A six-minute interval space given a number under "Part" enables the cost clerk to check the time in tenths of hours and read the cash entries from a wage scale. The small card is a coupon time card used in a tailoring business; each workman detaches a coupon and presents it for credit at the end of the day

Where a simple form is desired to take care of every kind of work and all departments, the system used in a small woodworking factory provides for the entry of either piecework or day work, production or indirect (Form XXXIV). The foreman hands each man his time note when he registers in, dating it. A goods tag on each truck load of parts gives the workman the

How Employees Were Grouped and 48 Rates of Pay Were Reduced to 10 in the Original Ford Classification

KEY

A—Mechanics and Sub-Foremen
B—Skilled Operators
C—Operators
D—Helpers
E—Laborers

Service—Employees in Service Continuously for Two Years and over
1—First Class Workmen
2—Men of Average Ability
3—Beginners

Skill Rate	Former Hiring Rate	Present Per Hour Rate	Rates Ranging Condensed To	59-60 65	52-58 60	46-50 54	42-45 48	38-41 43	34-37 38	29-33 34	26-28 30	23-25 26	20-22 23
A—XX				2	7								
A—X													
A—1		54				2							
A—2		48					45						
A—3		43						273					
B—Service		43						51					
B—1		38							606				
B—2		34								1457			
B—3	23	30									1317		
C—Service		38							19				
C—1		34								348			
C—2		30									2071		
C—3	23	26										4311	
D—1		34								31			
D—2		30									137		
D—3	23	26										416	
E	23	26										2003	
Special	20	23											206
										Total		13,304	

FIGURE XX: From a general survey of the entire operating force this skill rate classification was worked out at the Ford Motor plant. A few standard rates of pay on the hour basis were then determined and adopted as indicated here. This classification was made a few months before profit sharing with employees was introduced in the plant

information for filling in the first four columns and a tag on his machine or work bench, the operation number. As these various items are symbolized, the writing required of the men is slight.

He makes no distinction between piece and direct day work. As they pass out, the workmen deposit these notes in a box from which the foreman secures them early next morning for check-up.

On receiving a batch of these slips bearing the O. K. of the

foreman, the cost clerk checks the time against the clock sheets, marks in piece prices and day rates and then extends the money columns. He next files the notes by the workmen's numbers. In making up the pay, he takes each man's time notes and with a calculating machine totals his pay. Piece figures he posts to a distribution payroll which carries down the left-hand side, the workmen's numbers and across the top the different kinds of work. After checking back, he again sorts his time notes according to pattern and part numbers, and posts to an "operation cost record." From this, quarterly or semi-annually, average costs are struck by operations and from these, total part and article costs are built up.

One of the simplest forms for piecework is that in use in a large garment factory. A tag (Form XXXVI) is pinned to every garment. The ticket carries a coupon for each operation required. These are detached successively by the operatives, who turn them in at night for credit. Each operative's coupons for the day are verified, bundled and then filed by the payroll clerk.

Above the block of coupons, the tag contains a section divided into as many squares as there are coupons below—twenty-six for a coat. As the worker detaches his coupon, he place his clock number in the proper square. This gives the office a separate tally on the credits. A uniform piece price for each operation makes it possible to keep the system simple.

TAKING CARE OF THE PAYROLL AT MINIMUM COST

MODERN office appliances have made the routine of caring for the payroll simple and inexpensive. "Experience," says one manager, "has taught me that a $12 girl, a time register and a calculating machine can handle a payroll of one hundred in a day." The details of this manager's method are to check the job tickets against the clock slips, then to paste each man's six clock slips on a single sheet of paper, foot and extend in the margin, enter in a payroll book so arranged that the names, check numbers and rates are only written once a month, and address the pay envelopes, pay sheets, time cards and piecework tickets on an addressing machine. Where, as in the Ford Motor plant, every day is payday in some department, a small

payroll force will serve, with a uniform cycle of work (Figure XX).

When payday comes, the problem of getting the money to the men accurately and quickly has resulted in many ingenious devices. One plant has a long strip of oil cloth painted with the numbers. This is stretched for the occasion and each man covers his number. Another concern uses thin boards for the same purpose. Again, the numbers are painted on the wall. Passing down the line with the pay envelopes in numerical order, the clerks can quickly identify the men, secure their signatures and turn over the money.

To guard against paying the wrong man, and especially among non-English-speaking employees, duplicate identification checks have been successfully used. One check for each employee's number is round in shape, the other square. One week the paymaster receives from the workmen the round identification check, and after comparing numbers, slips the corresponding square check into the pay envelope. The next week he receives the square check and gives out the round. Checks not in use are kept on a "not employed board." When preparing the payroll, the paymaster consults this board to make sure that no dummy numbers appear. These checks are also used at the factory door and a square check presented during a "round check" week is immediately detected.

Part IV

KEEPING THE FORCE UP TO STANDARD

AUTHORITIES AND SOURCES FOR PART IV

Chapter XVIII. This chapter is based upon a study of advanced man-handling methods in more than a score of plants and industries, including Timken Roller Bearing Company, a southern railway system, General Electric Company, Felt & Tarrant, Carnegie Steel Company, two publishing concerns, a brass foundry, a bag-making concern, contract work, etc. Contributed by Mr. Murphy, with the collaboration of Mr. Porter.

Chapter XIX. William Hard has here summarized some of the most remarkable material presented by Josephine Goldmark in her book "Fatigue and Efficiency," recently issued by the Russell Sage Foundation. Studies of fatigue and efficiency in the laboratory and in German, English and American plants in many lines are covered.

Chapter XX. Based upon a study of benefit and pension funds and their administration in more than five hundred plants, including practically all the more important benefit plans in operation in the United States. The chapter was contributed by W. L. Chandler of the Dodge Manufacturing Company. Among the special features in this chapter are charts analyzing a mutual benefit association among the factories at Flint, Michigan, and a study of the most important industrial pension plans, showing the development of the pension idea since the American Express Company and other pioneers took it up in the seventies.

Chapter XXI. A collaboration by Robert W. Campbell, President, National Council of Industrial Safety and former Chairman, Central Committee of Safety, Illinois Steel Company; Mr. Murphy and Mr. Porter. The chapter presents safety standards and developments in the United States Steel Corporation, Chicago and Northwestern Railway Company, Avery Company and many other concerns.

Chapter XXII. Mr. Porter contributes this chapter, which is based chiefly upon his study of the advanced welfare methods of the Joseph & Feiss Company, with the collaboration of Richard A. Feiss, General Manager, and Miss Gilson, head of the service department. The welfare policies of many other plants have received consideration. Points of special interest in some of these are covered by charts and photographs.

XVIII

ROUSING THE INSTINCT FOR RESULTS

EIGHTEEN men at work in a borrow pit had in their average ten-hour day been sending down twenty dump cars of clay to the site of the dam which was being built in the river below. Three weeks later, under a new boss, the gang had been reduced to twelve men and was averaging sixty cars a day, with a high record of eighty loads in ten hours.

"A Y-section of track extended on either side of the borrow pit," the gang boss explained. "Two cars were placed on one branch and loaded simultaneously by separate gangs. Before they would be filled a pair of empties would come back and be placed on the other branch. The loaded ones would then be dispatched by gravity, and the gang, moving over to the other branch, would begin loading the pair of empties which the horse had just pulled back up the grade.

"When I took hold, the output was averaging twenty cars a day. To better these results, I first made the mechanical equipment as effective as possible; and, second, stirred my men to a keener interest in their work. I put the track in first-class condition, so that there would be no delays due to derailment, and placed in charge a man who was to see that the rails and especially the switches were in perfect working order, and that the loaded cars and empties were so handled as to avoid all delays.

"Next, I carefully sorted the gang, which was composed of Neapolitans and Calabrians in about equal proportions. Mingled, they had quarreled; apart, but pitted group against group, they worked with all the pride of their race distinction. This was a chief factor in increased output. Competition finally

became so keen that the gangs raced with each other not only to get a car filled first, but to heap it higher. Then the winners invariably would plant a green branch in the peak of the load and cheer as it rolled down the grade. And while they were cheering they were also relaxing. The short walk to the other track gave them an extra breathing space. I should say that they rested about two minutes out of every ten, or about twenty per cent of the time. For this reason they were easily able to stand the gaff of their own game.

"I further insisted that every man should use his shovel correctly. Naturally some did, but most did not and, as I soon discovered, it was not always because of ignorance. I had myself found out the best way previously, by shoveling at intervals on other parts of the work. I fixed on a reasonable shovel load and throwing distance, and on the correct way to throw. Thereafter, when I saw a man not filling his shovel sufficiently, or walking with it when within easy throwing distance, or handling the shovel awkwardly, I corrected him. Soon I had them all doing the operation in proper form. Whenever one took advantage of my back being turned to drop into his old ways, I got after him at once, and on one occasion I discharged a flagrant offender. After that I had no further trouble on this score.

"I also experimented with a workman whose confidence I had won, to establish a fair day's work. I put him by himself for several days at filling a wheelbarrow. By standardizing the shovelfuls per load and keeping track of the number of barrowfuls I found that on this material, which could be scooped up without previous loosening, a man should average ten cubic yards in ten hours. As I reduced my gang, the number of men worked out exactly; sixty cars of two cubic yards each became the regular production, totaling one hundred and twenty cubic yards, or ten yards to the man.

"Most of the men had been getting only $1.50 when I took charge. I retained only those who could hold up their end and paid all the maximum wage allowed on the construction—$1.75 per day. By this plan I soon had the confidence and loyalty of the gang. They would do an especially disagreeable job, such as working in water, for me when they would not do it for any-

one else. The pick of the force gravitated to my work and, on finishing it, persisted as a select gang for particular jobs."

Fear, loyalty, pride and ambition—the method by which in three weeks this young engineer increased his output per man from two and two-ninths to ten cubic yards, or four and a half times, embodies in an unusual way all these elements of appeal to the efficiency instincts in any class of workers. Loyalty—to the gang, the boss and the business, based on favorable working conditions; fear of discharge for the use of wasteful methods; pride in their race and record, based on knowledge of the best way to work; ambition to maintain themselves in a crew which was working at a premium wage.

It is a safe rule to keep fear of discharge and other penalties in the background, as a last resort for exceptional cases. Experience has shown what rich results are to be had by the manager who gets at the constructive impulses and so makes the workmen think of results and watch for savings until in a measure the chief's own profit sense becomes an unconscious instinct with the men.

WEEKLY MEETINGS OF THE MEN HELP TO DEVELOP LOYALTY

IN developing this instinct, some managers hold that if the loyalty of the men can be won it is more potent than high wages or profit sharing as a result-getter. To get the men acquainted, to get the gang to pull together and the department heads to cooperate, to get the men more keenly interested in the game the business is playing and the achievements it is scoring—these are the objects for which many tactful superintendents and managers are working (Figure XXI).

As a step in the development of this instinct for results, L. M. Klinedinst of the Timken Roller Bearing Company says: "An eastern manager makes it a custom to call weekly meetings of his men. He advises them of conditions that existed the week before, or what is to be done the following week and in particular what new business has come in from time to time. He has found that the men in the shop are interested to know what business is ahead and that they work together more progressively for this knowledge.

"At these workers' meetings every foreman reports delays in the work in his department and any friction which may have developed between his department and others during the week. These different topics are then taken up; both sides of the question are discussed, and the matter is adjusted by the manager. In this way the men can be educated and adapted to a particular line of employment."

"I used to rely entirely upon our foremen," said another manager, "but we now realize our best results through cooperation—by keeping close to the men and not letting them think that official position prevents me from sharing in and assisting them over their difficulties. Once a month or oftener we call the foremen together and talk over shop methods and the chance of making improvements, securing greater efficiency or cutting costs."

"I talk *with* my department heads, not *at* them," expresses the knack by which a general manager gets his men to work with him. When he starts a conference which involves person-

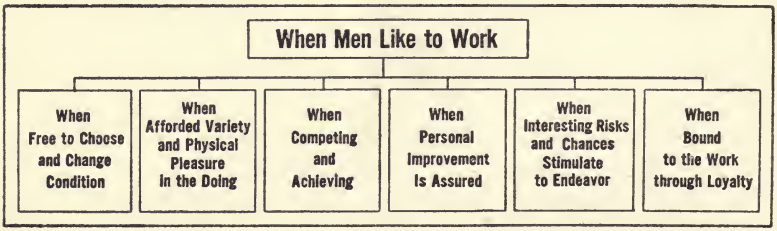


FIGURE XXI: One manager analyzes the spirit of work into these six elements. By applying such an analysis to conditions in his plant, a manager may secure the viewpoint of his men and get at the reason for unsatisfactory labor conditions

alities, he tries to eliminate the personal factor. He supposes that the difference of opinion over policy or methods is the idea of a third party or a development from the conditions of the business. Then he and his department head discuss this third and outside point of view. The ideal of results is put ahead of any personal consideration and the man as well as the manager is enabled to get a clearer perspective on the business.

The house organ that publishes the doings of an organization in a neighborly style has many ways of working up team spirit. Bulletin board notices, pay envelope slips and moving

pictures of processes and results are among the devices in successful use. One manager posts a chart showing the daily progress of the business. Record is made of all large contracts and orders and of progress on deliveries. Dozens of interesting points in these items enable the manager with a nose for news to get his men to watching results. At the works of the General Electric Company big turbines and other machines which are going to famous plants or on long journeys to foreign fields have painted on them their destination and use. This little news touch dignifies the work and helps the men to put personal interest into the product.

LEADERSHIP THAT ASSURES A WINNING TEAM SPIRIT AMONG THE MEN

WHEN this interest in the business blooms out into an expansive pride based on good working conditions, good leadership and a brilliant record—the sense of belonging to a winning team—output is apt to exceed expectations and endow the plant with an enviable reputation. Such is the case in the front shop of a southern roundhouse where the boiler room foreman has for five years kept his men ahead in their race with the machine shop force. Whenever a hazardous situation came up, a dangerous test to be made, or a man to be saved from an accident, he was always leading his men. When the work piled up, and the mechanics began to grin at the prospect of an empty machine shop adjoining the crowded boiler room, he had a working schedule that soon reversed the condition—an installation of air tools or air hoists that lifted weight from the shoulders of his men, short cut delays and enabled every man to do more in his nine hours. In five years, with a reduction in payroll, he has thus cared for an increased volume of work, sustained wage increases per man and four-fold increased output. The pick of all boiler men are at his command. Letters of application come from all over the United States, seeking work in a shop noted for good tools and a good boss. His men appear absorbed in getting results and approval. Their loyalty in rush times, overhours work and threatened labor troubles amounts almost to an ownership interest in the shop.

Reinforcing a man's pride in his shop, he needs an individual pride in his own share in the work. Self-respect demands that he feel himself of importance in the total result. Every worker, according to his intelligence, needs to see just what he is doing, as compared with good work, his past record and the output of his mates. He needs to be shown how, to have the mechanical conditions right, to have his errors pointed out. He needs to see his work and to feel responsible for a definite part in the general success. If he can also work towards a reward within the length of his own vision and ambition, proportionate to his share in the shop's success, and towards some honor, if he proves himself above the ordinary in skill, then his instinct for good workmanship is almost certain to keep growing.

With the routine worker, the recognized method of setting a standard and keeping his ability before his eyes is to pass the work to and beyond him on an automatic conveyor adjusted to a fair pace. This makes work more than routine. It gives something to compete with—to play against. A metropolitan daily newspaper uses such a conveyor to carry the printed papers from the press to the mailing room on the floor above. This conveyor, the superintendent of the plant has found, goes a long way toward keeping up a uniform speed among the mailers, though formerly when the papers were brought in on hand trucks, the work was uneven and less effective man by man.

FINDING PACE-MAKERS THAT TUNE UP THE ENTIRE PLANT

PACE making is a practical application of psychology, so managers believe. Let your shafting rattle, they will tell you, and you will notice that most of the hand labor is done to the tune of the shaft and belt. Connect the line shaft for a higher speed, so that the "lap-lap" of the belts becomes more frequent, and the men keep time to the rhythm. In the same way, not only machines and conveyors, but men, foremen and sales organizations have been found to pace the shop workers.

An Ohio brass foundry put on a keen, high-strung, journeyman at a dull-season job of keeping the men supplied with material. He set himself to do his best and to win promotion. Soon a surprising change was taking place. Production in the

department steadily increased until within six months it was doubled. After careful study the manager came to the conclusion that, as he had hired only the one new man, this helper, by

DEVELOPING THE MANAGEMENT INSTINCT IN WORKMEN

Suggestion systems give workmen a management interest in the business. Manufacturers who have tried such schemes have found that men must not only be asked to suggest, but also told how to suggest. Any system needs to be followed up closely. While scientific management does not necessarily provide for a suggestion system, more suggestions are likely to be made under such management. Where profit sharing is established, workmen are more likely to turn in ideas of their own initiative. Skilled workmen make fewer but more valuable suggestions than unskilled men. Managers have employed calendars, instructions, telephone cards, pay envelopes, placards and blotters in prompting suggestions.

One manager framed and hung in conspicuous places throughout his factory the following notice, which carried his signature:

Every employee of this company is invited to make suggestions.
We want your cooperation in our work.
We welcome criticism.
You are on the job. You are in a position to know what is needed, in many cases, better than any one else.
Use the suggestion blanks. Seal the suggestion in the addressed envelope and place it in the Suggestion Box at the east and west entrance, or send it through the mail (local service).
Each suggestion will receive my personal attention.
If you don't think the reason given for rejecting a suggestion is a good one, take the question up personally with the undersigned.
If you do not receive an acknowledgment for each suggestion sent in, notify the undersigned.
Do not expect to be advised as to the rejection or acceptance of your suggestion at once. It takes time to investigate and to secure the facts before passing on its merits.

his deft placing of material and care of tools, had tuned up the whole plant. He promoted his helper at length to a foremanship and now makes it a point to employ a truck hand who has the alertness and enthusiasm of a pacemaker.

Putting men on their mettle is another knack with the genuine manager. The average workman develops best when a

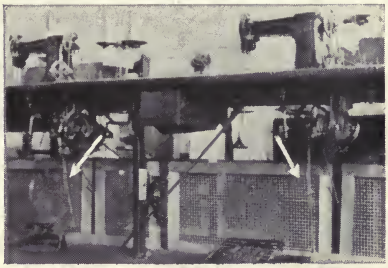
high standard of workmanship is set for him. Slovenly working conditions discourage craftsmanship. Where there is more than one shop in a town it is not unusual to find the shop that requires work to thousandths of an inch looked upon as the goal of the best men in the shop that works only to hundredths.

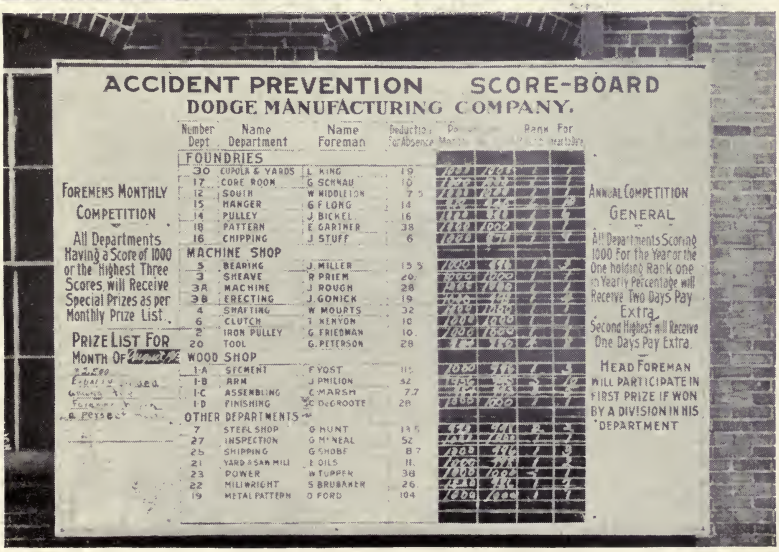
Giving each workman a separate working space—an individual machine or bench of his own—has a similar appeal. This fixes a definite responsibility, a definite task and definite recognition. Where men are allowed to gang together (unless the work so requires and they are paid as a unit) their efficiency usually reduces to that of the poorest hand. It is human nature to work hardest when there is a certain amount piled up ahead—not so much as to discourage effort, however. It is equally well proved that operatives slow up when they have accumulated what constitutes a good showing. Moreover, the average workman will hustle to pile up work for the other fellow—but not to give him the pleasure of piling in more work to be done. In line with these principles, one carefully planned factory has grouped similar operations in natural departments, separated by glass partitions, has given each man his own working space and has allowed for a moderate pile of work ahead of each man, with an almost continuous removal of his completed product.

Piecework is distinctively the payment method that individualizes every worker. The piece rate or a scale of wages frequently readjusted to each man's efficiency has scored especially favorable results where each workman is in a shop or on a job of his own. When the element of friendly competition among the men is also introduced, results are sometimes phenomenal.

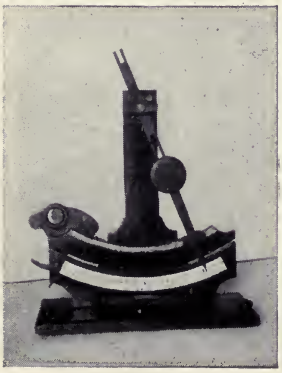
In the trucking end of a manufacturing business one of the greatest leaks is the time wasted by drivers. They resent bitterly, however, any attempt to check up their time by recorders or other detective methods. Yet by applying the principles of efficiency wages and friendly competition, a bag-making concern in Cleveland has stirred its drivers to a genuine proprietorship instinct for time economies.

When it was decided to put service recording registers on its trucks, the garage manager frankly took the drivers into confidence. The recorders were, he explained, to determine good





Accident prevention in the Dodge Manufacturing Company has been made a contest by means of the score board shown below. Safety-guards prevent the operator's clothing from becoming entangled in the shafting (middle, right). In the same plant a "safety cord" (above) is strung down the middle of the room. By pulling it, all the machinery can be brought to an emergency stop



In long continued effort, the body is overloaded with the poison of fatigue and requires a disproportionately long time to recuperate. In increasing labor efficiency at many plants, this principle is established by the work and fatigue-recording instruments here shown. The arc at the left (below) is a chronoscope, which measures the quickness of an individual's reaction in rest and in fatigue

and bad drivers with the idea of excusing men for unavoidable delays and raising the salaries of the drivers who were earning more. On the wall of the garage office hangs a large blackboard. The top row shows the truck numbers; under each is recorded gasoline purchase receipts, shipping clerk's record of the truck's tonnage, hours of service, fuel, travel and stops. A monthly summary is made for each item. All the records are open to the inspection of the drivers. To hold the record at the end of the month has come to be an item in the day's work. The result in time saving, in more trips and better tonnage is a recommendation for fair pay and working standards.

Some form of team spirit or profit sharing is often needed to balance up the selfish influence of the piece rate. When, too, fair pay and a carefully scored game are added, with a prize for the winners, results are apt to reach their maximum. Those who have gone into Pittsburgh over the main line of the Pennsylvania Railroad may often have observed a gigantic broom at the end of one of the mill buildings at Bessemer, the big blast furnace plant of the Carnegie Steel Company. This broom is one of the greatest emblems of the result-getting instinct among workmen, as well as one of the greatest dividend-payers ever devised. It denotes that one of the furnaces in the group held the world's record in production, when the broom was officially declared a fixture at Bessemer. Men have blistered their hands and managers have spent sleepless nights that it might be proudly displayed by their furnace. The men that have won it in times past did so at an effort no reasonable cash bonus could possibly have bought or inspired.

So there is in work something of the same element which historic battle flags have symbolized. In the words of F. G. Coburn: "The human part of industrial management is the use of certain psychological or psychic influences to cause employees to work hard, loyally and intelligently; and the degree of success attained depends largely on the number of these influences that are correctly used. They have never been clearly defined and are not clearly understood, even by those who use them. When they are defined, the industrial manager will have a set of proximate rules for a game which is at present played without rules."

XIX

REGULATING WORK TO AVOID FATIGUE

THE Zeiss Optical Works at Jena, Germany, reduced its work-day from nine hours to eight and increased its output. Ernst Abbé was a member of the board of directors. He was also a professor of physics in the University of Jena. He compared the speed of the seasonal pieceworkers in the Zeiss plant during the last nine-hour year with their speed during the first eight-hour year. These workers, 233 in number, in the last nine-hour year had worked a total of 559,169 hours. In the first eight-hour year they worked a total of only 509,599 hours. A decrease of about nine per cent. In the last nine-hour year they had earned a total of 345,899 marks. In the first eight-hour year, at identical piece rates, they earned a total of 366,484 marks. An increase of almost six per cent!

The individual product per hour shows the gain to the firm even more clearly. If the individual worker could rise 12.5 per cent in hourly productivity, his product at the end of eight hours would precisely equal his former product at the end of nine. What happened was this: The average hourly earnings of the individual pieceworkers in the last nine-hour year had been 61.9 pfennig. The average hourly earnings of the individual pieceworker during the first eight-hour year was 71.9 pfennig. An increase not merely of 12.5, but of 16.2 per cent! Each man did ten days' more work during the year of shorter hours.

Abbé's father had worked a sixteen-hour day in a textile mill, and had lived to see the rival spindles of England outdoing competition though limited by law to a ten-hour day. But this sit-

uation had not been interpreted. Fatigue had not then been diagnosed as a "diseased" condition of the body. Recuperation from fatigue had not been studied as a necessary preliminary to efficient industrial labor.

It was during Abbé's student days at the university that Ranke, the physiologist, performed the first notable fatigue experiment. Taking an extract from a frog muscle that had been thoroughly exercised and exhausted, he injected it into the blood vessels of a frog that had been at rest. The muscles of this second frog immediately showed great feebleness in contracting—that is, in doing work. This test proved that fatigue could be transmitted, *like a toxin,* from one animal to another. A later experiment showed that fatigue, just as it can be artificially introduced into a muscle, can be artificially withdrawn from it. A detached frog muscle electrically controlled until fatigued, then washed, through its blood vessels, with a salt solution, regains its power.

These scattered studies of animals and human beings have now been expanded into a "literature of fatigue," the principal teachings of which (for business purposes) are:

Every muscle-cell, besides being an energy-mill, is a poison-mill. It stands on the brink of the blood-stream. From that stream it receives its raw materials, pure. Into that stream it returns its by-products poisonous.

The cell, in part, lives. Its raw materials and its waste products are dead. The minute machinery of the cell is operated continuously, building dead food into living tissue, and breaking down living tissue into dead waste.

In the dead waste, borne away by the blood-stream, there float substances that are, in particular, "fatiguing"—namely, sarcolactic acid, monopotassium phosphate and carbon dioxide.

Labor speeds up the machinery of the cell. Within the cell there is a substance called glycogen. It is energy, latent, like coal. The machinery of the cell is forever constructing it, forever consuming it, forever trying to lay up a reserve supply of it.

During continued labor the time comes when an excess amount of glycogen is needed. The machinery of the cell grasps at all of it, including the reserve-supply, and manufactures it into power and therefore into waste which through the blood-stream

poisons the body. Such is fatigue for the muscle-cell. Such, also, is fatigue for the nerve-cell. A tired man is a poisoned man.

The employees at the Zeiss Optical Works could be said to have been engaged in labor sufficiently intense, when prolonged for nine hours a day, to leave them too poisoned to be able to make complete recovery by whistle-time next morning.

HOW SHORTER HOURS HAVE YIELDED MORE AND BETTER WORK IN MANY FACTORIES

MATHER & PLATT, at Manchester, England, own the Salford Iron Works and make such things as steam engines, pumps, and boilers. They curtailed their work-week from fifty-three hours to forty-eight, out of curiosity as to the result. At the end of the first trial year they reported that their output per week per man had been enlarged.

"We seem," Mr. Mather says, "to have been working in harmony with a natural law, instead of against it. The most economical production seems to be attained by employing men only so long as they are at their best. When this stage is passed, there is no true economy in their continued work."

Mather further commented on the "cheerful energy" of the men. This evidently arose not from gratitude but from rest. The peak of gratitude must have been reached on the very first day of the experimental year. The peak of energy, as piecework earnings indicate, was not reached till toward the end of it.

Ernest Abbé studied loyalty and effort in the Zeiss plant at Jena. He observed that the increase of speed under the eight-hour system was almost involuntary. "The workers, most of them, were unconscious of their increased intensity of work. Many would not believe that they had produced more in the eight hours than in nine until shown the proof."

The Zeiss employees were genuinely conscious neither of charity nor of exhaustion. The financial success of the eight-hour day in the Zeiss optical works was due solely to physical recuperation.

During labor, as during rest, the body attempts to destroy or to expel the poisons of fatigue. It destroys them in the blood itself and in the liver. It expels them through the kidneys and

through the lungs. During rest, the process of purification gains on the process of pollution. During labor, it drops behind. It not only fails to equal the pace of the process of pollution but it slackens its own pace. *A double amount of pollution requires more than a double period of purification.*

Out of this law reversed, scientific management has sleight-of-handed some of its most magical offerings to American industry.

If you cut down the amount of pollution by half, you cut down the required period of purification by more than half.

Let the flexor muscle of a human finger, harnessed to a weight, lift it thirty times. It will then need (say) two hours of rest before it can regain full vigor. But let it lift the weight only half as many times—fifteen. Its required period of rest will sink not merely to half of two hours, but to thirty minutes. In the case of a weight of six kilograms, the flexor muscle, if granted a rest of ten seconds after each lift, "showed no fatigue."

GETTING THE MAXIMUM AMOUNT OF WORK WITH THE LEAST FATIGUE

THIS laboratory practice of men like Mosso and Maggiora soon became the shop practice of men like Frederick W. Taylor.

Taylor made the pig-iron yard of the steel works at Bethlehem, Pennsylvania, one of the "historic spots" of this country. The public sees that pile of pigs. It sees the freight car. It sees that plank. It sees Schmidt walking up the plank and dropping pigs into the car at the rate of 12½ tons a day. It sees Taylor whispering to Schmidt. And then it sees Schmidt walking up the plank and hurling pigs onto the car at the rate of 47½ tons a day; and its admiration for Taylor is swamped in its sympathy for Schmidt.

Taylor, however, in his very first account of the event, said that in order to get Schmidt to move 47½ tons he had to break him of continuousness and teach him to be *dis*-continuous. Taylor had begun, years before, to try to measure "the tiring effects of heavy labor." He sought the mathematical relation between fatigue and the number of foot-pounds of work done. He was often frustrated, but finally the law emerged.

Schmidt was the first distinguished victim of this law. The mode of his execution follows: "When pig-iron is being handled

(each pig weighing ninety-two pounds), a first-class workman can be under load only 43 per cent of the day. He must be entirely free from load during 57 per cent of the day. As the load becomes lighter, the percentage of the day under which the man can remain under load increases.

"If now Schmidt had been allowed to attack the pile of 47½ tons of pig-iron without guidance, he would have tired himself out by 11 or 12 o'clock. By having a man, however, who understood this law direct his work until he acquired the habit of working at proper intervals, he was able to work without unduly tiring himself." Hence the stern orders to Schmidt: "Now pick up a pig and walk. Now rest."

The Zeiss optical works increased its output by giving its workmen recuperation at the end of a shortened work-day. Taylor increased Schmidt's output, in addition to teaching him thrifty manual tricks, by giving him recuperation at frequent intervals during a work-day of the same length as before. The query, "What is the right work-day length in *our* industry?" calls up two more recent American experiments, the one touching quantity, the other quality of output.

In a letter presented in evidence before the Committee on Labor of the National House of Representatives, William Crawford, a monument manufacturer of Buffalo, said:

"Just thirty-two years ago we commenced to keep a record of the value of each man and the exact cost of each piece of work. This cost system shows that the same man, under identically the same conditions, accomplished more of the same kind of work when he was working nine hours than he did when he was working ten hours; and, again, when the hours were reduced to eight hours, this same man accomplished still more in an eight-hour day than he did in a nine-hour day. My observation is that any good granite cutter could do just as much in seven hours as in eight."

About the same time the Commonwealth Steel Company had to cut the hours of its furnace crew from twelve to eight hours a day. The results reported by Mr. Bull to the American Foundrymen's Association are principally in the field of physical exactness. For instance, the furnace crew was expected to be economical in feeding "extra" pig-iron to the furnace dur-

ing heats. During the last four weeks of the old system the average amount of "extra" pig-iron used during each heat was 556 pounds. In the first four weeks of the new system it was 424 pounds and later as low as 137.

The average amount of fuel oil used "per ton of metal charged" came down from 55 to 49 gallons and the failures to keep the steam at its pressure from 77 to 42.

From these and other tests, Mr. Bull felt satisfied that "a careful comparison along the lines indicated would convince any steel manufacturer of the wisdom of operating with three eight-hour shifts, purely from an *economic* standpoint."

Mr. Bull's demonstration of the effect of physical recuperation on physical exactness supplements Schmidt's demonstration of the effect of physical recuperation on physical force. In operating Schmidt, Mr. Taylor established a mathematical formula for the intervals of recuperation to be inserted into his long work-day. If his work-day had been shortened by an hour, what would have happened? The next day? The next year?

Schmidt's work was not of a delicate variety. It was hardy. An extraordinary fact about delicate work and hardy work appeared in the tabulation of earnings of the Zeiss pieceworkers. The last column of the tabulation showed that the smallest increase in speed was made by the microscope grinders, doing work extremely fine. The greatest increase was made by the carpenters, doing work enormously coarser. It shows, almost uniformly, that the heavier tasks jumped faster than the lighter.

The traditional work-day is built on the principle that the heavier tasks need a short work-day less than the lighter ones, and respond to it less quickly. Clearly the present is no time for tradition nor for dogmatism. Fatigue varies from task to task. The recuperation periods vary. The work-day will vary. Its one fixed element will be *possibly* the sustained physical condition of the worker.

The work of the physiologist and the work of the engineer have come together. It is only by experiment in each industry, by the transformation of each industry into a laboratory, that the "efficiency" work-day can be disclosed and the factory force saved from the drag of cumulative fatigue.

XX

HOW BENEFIT AND PENSION PLANS OPERATE

SELF-INTEREST is the basis on which the most effective appeal for service work must rest with both employer and workman. Here are the two extremes:

One is an old shop, damp, poorly lighted and ventilated, with inadequate toilet facilities; with its workmen forced through circumstances to live in homes that depress or even cause sickness. No care is exercised to examine new employees, so that tuberculosis, syphilis, and other diseases are brought among the workmen. Employees in this shop cannot work to the best advantage. Who loses when they are sick? Both capital and labor, as well as society in general, suffer the loss.

The other shop is one toward which many believe self-interest leads us: light, dry, well heated and ventilated; with sanitary toilet facilities, free baths, pleasant surroundings and happy homes; all of which tend constantly toward happiness and cheerfulness. Care prevents cases of contagious disease from endangering the lives and happiness of other employees. Free medical, dental and aural service is available for the worker and his dependents, as well as a visiting nurse to assist the wife in keeping the family in trim. To overcome local handicaps, many such facilities usually exist as corporation schools, libraries, gardens and playgrounds. Men living under such conditions should be working up to the highest degree of physical efficiency, earning more for themselves and for the establishment.

Benefit and pension plans are fundamental in any service program through which the management would protect its workers from deterioration. Out of some five hundred prominent manu-

facturing establishments addressed by letter as to such benefits, about twenty-five per cent reported the existence of benefit funds. In the report of the Commissioner of Labor, 461 funds are enu-

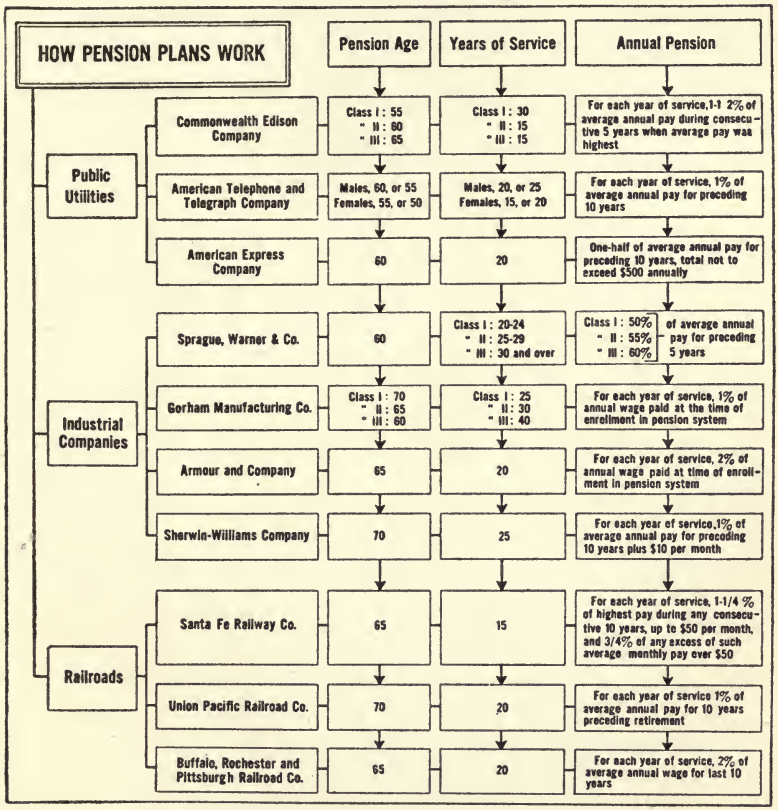


FIGURE XXII: Ten representative plans for providing pensions for employees disabled by age or other causes are here analyzed. All are non-contributory—that is, the company contributes the entire fund—except Armour and Company, who have set aside $1,000,000 for pensions and in addition, assess employees 3% of their annual pay (assessments refunded when employees leave). A maximum and a minimum for the annual pension are usually set, and nearly all of the companies reserve the right to revise the rate in certain emergencies

merated. From these two sources the following facts and figures have been drawn.

Preliminary to the establishment of a fund, the manager may well recognize that his cooperation in such directions as medical work is a great aid in keeping down the cost of benefits. This co-

operation has taken the form of physical examinations which head off serious illness, first aid service to minimize injuries, and free medical consultation, sometimes wisely accompanied with free medicine and a follow-up system to make sure that the patient observes instructions. Out of the 461 funds, twenty per cent provide some such cooperation. The average disability per member of all funds was 4.7 days. Presumably this covers cases resulting finally in death; and for perhaps two dollars increase in dues, with a slight addition while the plan is becoming established, medical service of this sort could be included in the benefit plan itself.

To do so would make the entire plan more attractive to the average employee—and a fund must have its selling points, the same as an insurance policy or an article of merchandise. The variety and amount of benefits, as well as the duration, if made attractive and clearly explained, will convert a large percentage of the prospects into members and boosters. For example, the average temporary disability of all funds was only 22.2 days, while the predominating limit of benefit was thirteen weeks; therefore, liberality in settling on the limit does not represent probable expense in proportion to the number of weeks involved. A small additional loading of dues will permit quite an extension of time limit.

An average death benefit of $210 cost the fund $1.45 per member for the year; and as this is based on funds having 318,892 members, it ought to be more or less trustworthy.

An average taken in funds having 65,889 members disclosed the fact that about fifty dollars' benefit for the death of a member's wife cost twenty-five cents per year per member. Funds with 44,381 members pay benefits for death of other dependents ranging from about ten dollars for a still-born child to twenty-five dollars for an eighteen-year-old child; fifty for father, mother, brother or sister, and one hundred dollars for a daughter in charge of the household of a widowed member, all at an average cost of twenty-eight cents per member.

Statistics covering 350,000 members show that benefits for temporary disability cost the funds an average of $3.42 per member. These benefits range from twelve cents to fourteen

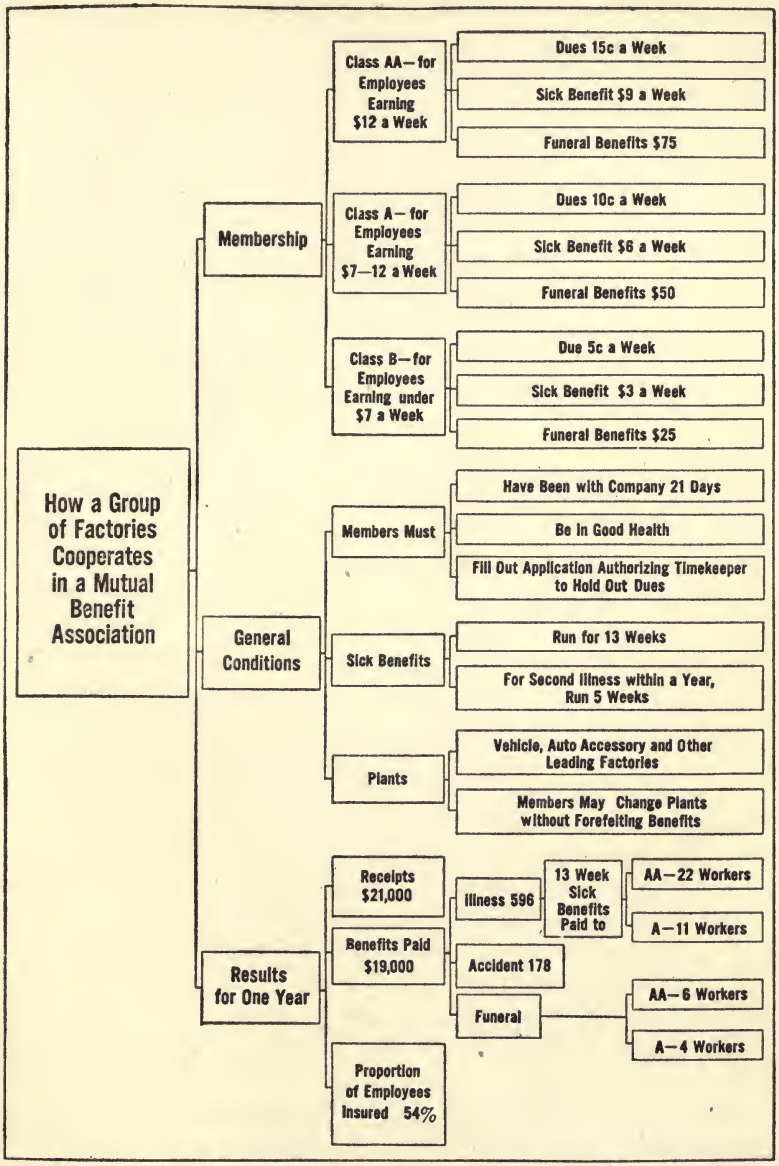


FIGURE XXIII: How a benefit association successfully operated among local plants in various lines of manufacture for more than a decade is shown by this chart of the benefit association among the factories at Flint, Michigan. The insured worker can go from one plant to another without losing his protection. Under "Results" are shown the actual number of cases of illness, accident and death

dollars per day, but one dollar was the predominating amount, and thirteen weeks the most popular time limit.

Taking into account 461 funds, the members contributed an average of $5.72 and the establishments $1.81 per member. Additional revenue was earned by many funds through entertainments, investments and candy booths, and in answer to a query of the Commissioner of Labor, only 1.7 per cent admitted having suffered financial straits of any kind, and these were due to causes such as epidemics. One fund doubled dues temporarily, while others borrowed or sought donations. The average death rate was 6.7 per thousand members, being less than the general death rate of the country as a whole, because only able-bodied men or women are able to gain or retain positions in establishments.

Various benefits for permanent disabilities due to loss of fingers, eyes, hands or feet, may be added apparently for a cost of forty-eight cents per member per year. Of the members of funds providing for permanent disability benefits, only one-quarter of one per cent received such benefits in one year.

These benefits are found in only twelve per cent of the funds and cover accidents in only two-thirds of those concerns.

It would appear that, except in hazardous occupations, by loading the dues of all members with ten cents per month, a fund should give benefits for permanent disability and death of wife or other dependents with a factor of safety of twenty per cent.

Theoretically at least, one dollar per month dues should permit the following benefits for sickness or accidents:

$1.00 per day for temporary disability for 13 weeks.
$75.00 for loss of a hand, foot, or eye.
$200.00 death benefit.
$50.00 benefit for death of wife.
$25.00 benefit for death of other dependents and for free medical service.

While this is a crude estimate, it figures about fifty per cent above the average figures of all funds, and seems to be fairly conservative. It should be possible occasionally to remit the dues for a month.

Proportionate dues and benefits for other classes of member-

ship could be estimated, and probably members would not be hard to secure if proper sales-methods were adopted to show the advantages available, as for any other form of protection.

The effectiveness of the salesmanship used in starting such plans is reflected in the percentage of membership to number of eligible employees. These percentages of efficiency vary from two and one-half per cent in one case to one hundred per cent in others. The membership in all funds averages about forty-eight per cent. It is interesting to note that where funds were managed exclusively by employees, only thirty per cent were enrolled; where the establishment and employees managed jointly, sixty-six per cent were enrolled; and where the management rested exclusively with the establishment, seventy-five per cent were enrolled.

One feature all have to contend against is the changing of employees. Practically one-third of the 342,000 members changed during the year, due in ninety-two per cent of the cases to employees leaving the establishments. An interchange of membership privileges among concerns would therefore make the benefit funds of all more stable.

KEEPING THE MEMBERS OF A BENEFIT ASSOCIATION ENTHUSIASTIC

FIFTEEN per cent of the establishments have more or less compulsory membership provisions, and yet about one-quarter of these funds were managed by employees alone, and one-half jointly, showing strong cooperation of these establishments with the funds.

A much better way than compulsion is to have one or more enthusiastic men all the time enlisting interest. They must work either in the background or, preferably, as secretary or treasurer, visiting the home and the sick, and otherwise getting close to members and their families. Often corporations supply such men, bearing the cost themselves.

While it is desirable that the employees feel that they are free to dictate in the management, still there will be no complaints from members if the corporation man acting as, say, secretary or treasurer, is operating the fund in the interests of the members. They will soon determine whether he is "for 'em or agin

'em,'' and that is their principal concern in the matter. If the members feel they are getting their money's worth, they will be willing to help boost.

Old members are in some cases allowed to continue membership after leaving the establishment, but that plan seemingly has not been a huge success. Such members often leave town or engage in more hazardous occupations; also they are too hard to keep track of, when drawing benefits, without an organization much more elaborate than most funds require for regular members.

One harness factory with forty-five employees has a flourishing association of thirty-one members (sixty-nine per cent). Dues are twenty-five cents per month, but in one year were remitted for ten months. They pay five dollars per week temporary disability benefit from the treasury and cover death benefit by an assessment of one dollar per member. The association received no financial aid from the establishment. With such a showing they should have been even better supported by the workers.

Ten establishments each with from fifty to one hundred employees have funds averaging eighty-three per cent in membership. The average dues in these funds are less than fifty cents per month, and the benefits about one dollar per day. Death benefits range from fifty dollars to one hundred dollars.

Flint, Michigan, has a fund endorsed jointly by the manufacturers, covering the employees of nearly all the plants. This idea might well be adopted in other communities, especially for small shops (Figure XXIII).

HOW TO MAKE EMPLOYEES EAGER TO BOOST THE MEMBERSHIP

SOME funds have a low membership fee for a short period after employment begins. Instead of an assessment plan, which to the member seems to be working overtime, memberships may also be influenced mightily by collecting dues slightly in excess of actual needs, and remitting the dues at, say, Christmas time. The cost to the member is the same in either plan.

Some establishments have succeeded in enrolling ninety-five per cent of their employees without resorting to compulsion.

This has been accomplished by the corporation offering to pay additional sick benefits of one dollar per week when the membership exceeds eighty per cent, and two dollars per week after the nine-in-ten mark is passed.

Consequently every member becomes anxious to boost the fund membership. Imagine the impression made upon a new man coming into a shop where ninety-five per cent of the employees are after him to join the fund. He must be favorably impressed, to say the least. The best argument of all is that the plan works and has been working successfully for several years in a few funds. Ninety per cent voluntary, moreover, is far better than one hundred per cent compulsory membership.

The bonuses need not be the same as quoted herein, but they should be so arranged that each member will feel vitally interested in them as his own, and not put into the treasury so that they may be lost sight of.

In comparing such funds, one will be greatly impressed by the wide variations found in dues and benefits. For example, dues for first-class memberships range from $2.60 to $36.00 per year, with benefits somewhat in proportion; temporary disability benefits run from nothing to twenty-five dollars per week, over periods of from five weeks to two years. Employees are eligible to become members at once or at any time within a year after employment. Waiting time after disability begins ranges from none to fourteen days; death benefits vary from nothing to two thousand dollars. Some provide eligibility for death benefit to new members, and others require up to three years' membership. Some funds have one class of members and others have up to eight.

These facts suggest a line of action both for associations now operating and on new funds to be established. Interchange of experience and data is one guaranty of success. The conduct of a new benefit plan should be attended with a study of funds in kindred lines, and those in charge should "feel their way" until familiar with their own conditions.

XXI

TRAINING MEN TO BE CAREFUL

INDUSTRIAL accidents, generally speaking, are of two kinds: the preventable and the unpreventable. That is, relatively speaking, for in the absolute all accidents are preventable and practically a very large per cent can be obviated. In undertaking the solution of the problem in any factory the steady aim should be to reduce to zero the first class, as speedily as possible, and to remove the second from the realm of the unpreventable.

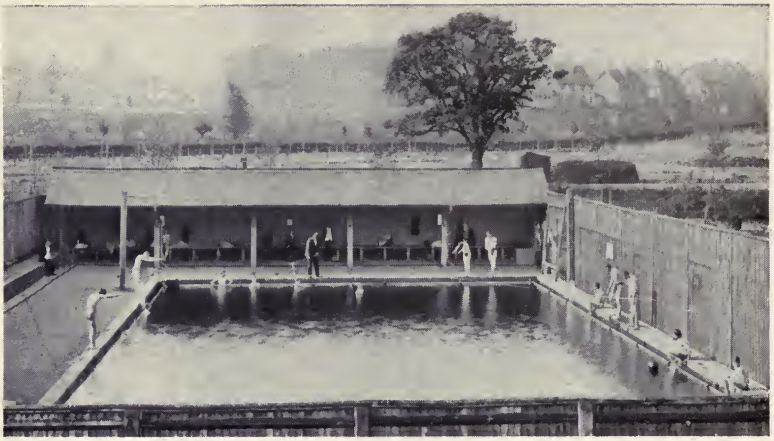
In the first class there are two principal causes: (1) failure of the management to provide and maintain proper working conditions, and proper and efficient safeguards upon dangerous machines and appliances; (2) ignorance and carelessness on the part of the workman.

The industrial plant, therefore, which seriously takes up the work of accident prevention, in addition to providing proper working conditions and genuine safeguards upon machines, must also educate its men and inculcate in them habits of caution. "Safety first" becomes the rule.

This evidently presupposes a definite plan of procedure and the development of a comprehensive organization to execute the plan. The provision of adequate safeguards is in all cases important; but of greater importance and more difficulty is the work of organization and education without which even the best mechanical protection is futile to prevent most accidents.

Safety appliances will be neglected in spite of stringent rules; they may actually encourage greater carelessness on the part of the men, or result in accidents due to the awkwardness of ex-

With the passing of the dinner pail, manufacturers are finding it worth while to make noon conditions a relief to the minds and bodies of their employees. Standard equipment for the noon meal is installed in the dining rooms at the Joseph & Feiss ("Clothcraft") plant (above), and at the Western Electric Company (middle). Magazines are available at noon among the General Electric apprentices (below)



That better work follows play has become a principle for employees as well as managers. How this principle has been observed is shown by the reading room at the National Cash Register's plant, the girls' athletic grounds adjoining the Clothcraft plant in Cleveland, the outdoor tank of the Cadbury Company at Bourneville, England, and the general athletic field of the N. O. Nelson Company

cessive caution. To induce in the mind of the worker just the right attitude toward safety is, therefore, a task that demands of the manager not only tact and persistence, but also a nicely balanced judgment.

In dealing with this educational phase, the organization as it exists in the United States Steel Corporation and the Illinois Steel Company—a subsidiary of the corporation—will be used as a guide.

For a number of years the steel corporation, with its subsidiaries, has been carrying on an active campaign for accident prevention. Covering the entire corporation is a committee of safety composed of the general solicitor, who acts as chairman, the manager of the bureau of safety, relief, sanitation and welfare, who acts as secretary, and seven others. Each is a representative of one or more of the subsidiary companies.

This committee at intervals makes trips through the several plants, inspecting conditions thoroughly for safety. Quarterly it meets to consider proposed safety devices and plans for creating a greater interest, on the part of the workmen, in the movement. All serious accidents are given detailed consideration with a view to preventing their recurrence. Periodically this committee issues bulletins on safety, sanitation and welfare work and in general acts as a clearing house for all the companies.

In the Illinois Steel Company there is a similar committee, called the central committee of safety, which covers all the plants of this company, has general supervision of all safety work and acts as a clearing house for safety ideas. This committee is composed of the general attorney of the company, who acts as chairman; his assistant in the legal department, who handles accident matters; the assistant general superintendent; the safety engineers of all of the plants; and the manager of the safety and relief department, who acts as secretary. Meetings are held monthly. All accidents are considered which are in any way serious or from which a lesson can be drawn, and if possible, steps are taken to prevent a recurrence. Safety devices and plans to interest the men are discussed. These may originate in the committee, or be referred to it by plant committees, or come from other subsidiary companies through the general committee of the corporation (See page 203).

To assist this committee, special subcommittees are from time to time appointed, to investigate and report on special hazards which are too technical for the committee as a whole to handle adequately. The membership of these committees is confined to engineers, or master mechanics or department superintendents who have expert knowledge of the matter under consideration.

The central committee has issued books of rules and specifications, standardizing safety devices and regulating operations from a safety viewpoint. Monthly it publishes safety bulletins properly illustrated with cuts showing how accidents happen and how they may be prevented, with pictures of safety devices, together, if possible, with a photograph of the inventor.

Then in each plant of the company there is a plant committee of safety, which is composed of the assistant general superintendent, who acts as chairman; the safety engineer, who acts as secretary; and two or more department superintendents. This committee has general jurisdiction over safety matters in that plant. It meets monthly and the date of the meeting is at least one week in advance of that of the central committee. When a serious accident occurs in the plant the committee in a body visits the scene at once and makes a thorough investigation. At the monthly meetings not only these accidents, but accidents in other plants of the company are taken up. All recommendations, from whatever source, also are considered and a complete report sent to the central committee.

Each department of the plant also has its permanent safety committee, composed of foremen and leading workmen who are selected because of capacity, force of character and ability to lead and influence their men. The chief duty of the members of this committee is to make monthly inspections of their own department, recommending to the department superintendent safety devices and plans for preventing accidents. A copy of their recommendations is sent to the safety engineer, as the secretary of the plant committee, and by him is presented at the next regular meeting of that committee, together with a report as to action taken thereon.

The department committee also investigates all accidents occurring in the department, reporting to the superintendent—with a copy to the secretary of the plant committee—how the

HOW ONE COMPANY HAS ATTACKED THE ACCIDENT PROBLEM

I. Organization (Value 45%).
- A. Executives.
  - Attitude most important. Unless executives are imbued with safety idea, efforts bear little fruit.
- B. Safety Committees.
  1. Central. Composed of General Attorney, Assistant General Attorney, Assistant General Superintendent, Plant Safety Engineer, Manager Safety and Relief Department.
  2. Works or Plant. Composed of Assistant General Superintendent, Safety Engineer and two or more department superintendents.
  3. Departmental. Composed of foremen and leading workmen.
- C. Inspections.
  1. Safety Engineer. Inspects all departments constantly.
  2. Safety Committees. Inspect own department monthly.
  3. Special Committees. Investigate special conditions.
  4. Individual Workmen. Each workman keeps an eye on himself.

II. Education (Value 30%).
- A. Rule Books.
  - Each workman on entering employ receives one of these.
- B. Instruction.
  - Foreman instructs each new man thoroughly in his duties.
- C. "Safety First" Buttons.
  - Given to each man upon passing examination on rule book.
- D. Prizes.
  - Given to individuals in departments as a reward for effecting reductions in ratio or number of accidents.
- E. Bulletin Boards.
  - Maintained at various points within and without plant.
- F. Safety Dinners.
  - Promote fellowship spirit, increase enthusiasm for safety.
- G. Safety Lectures.
  - Illustrated by motion pictures. Families may attend.
- H. Discipline.
  - Administered as recommended by department committees.

III. Safeguards (Value 25%).
- A. Installation.
  1. Inspections. By safety engineers,
  2. Drafting Room. Draftsmen have safety standards to follow and all drawings must be checked for safety.
  3. Purchasing. Requisitions for new equipment must specify safety and are checked for this.
  4. Construction Department.
- B. Maintenance.
- C. Use of.
  1. Education. To teach respect for safeguards.
  2. Inspection. To see that guards are working properly.
  3. Discipline. To deal rigorously with all offenders.

accident happened; what in their opinion can be done to prevent a similar accident; who, if anyone, they think was negligent, and what discipline they recommend being meted out to the blameworthy person.

Thus it will be seen that, reaching from the smallest department in a plant to the general safety committee, there is a closely knit organization cooperating for accident prevention. Safety propositions originating in the safety committee of a subsidiary company are passed through the general committee of the corporation to the central committees of other subsidiary companies, and by each such committee are passed on to the plant and department committees.

Even in the smallest plants it is possible to appoint at least two or three leading foremen or workmen on committees, who will do very efficient work and in a way fill the place of a safety engineer, the employment of whom would not be practicable. In small plants the personnel of such a committee could be changed from time to time and membership ultimately be rotated throughout the entire working force. These committees report directly to the management, when the plant is small, and where used have given very valuable service.

EDUCATING WORKMEN TO GUARD AGAINST ACCIDENTS

THE element of education in accident prevention work is one which cannot be controlled by compulsion or by legislation, and must be the result of a well-organized effort and the establishment of a fine company spirit throughout the plant.

Reliable statistics show that at well-safeguarded industrial plants, from eighty-five to ninety per cent of the accidents which occur are caused by the carelessness or ignorance of the men themselves, and that even in plants not so well protected the percentage of accidents so caused is very large. It therefore follows that while safeguarding arrangements are absolutely essential to any satisfactory safety work, the problem of the education of the men, and the inculcation in them of habits of caution, is even more important. The burden therefore rests largely upon the plant superintendent and his department superintendents and foremen.

The attitude of the superintendent and the foreman toward the prevention of accidents will be reflected by the workmen just as accurately as their attitude toward the getting out of production is reflected. If the superintendent treats safety mat-

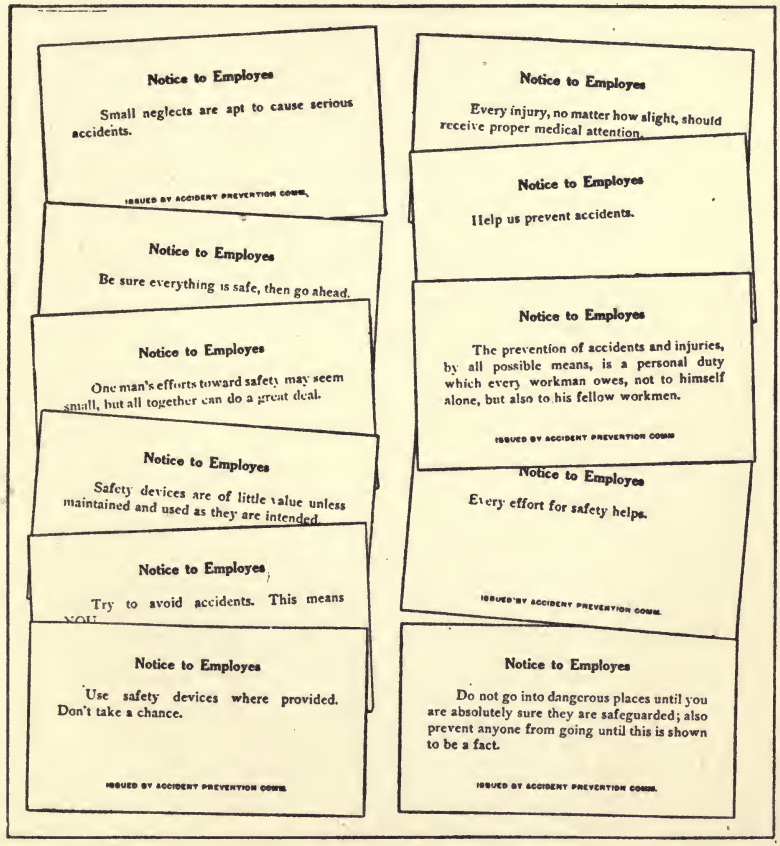


FIGURE XXIV: Cards of different colors bearing printed warnings and safety advice, are inserted in the pay envelopes of an eastern company on alternate weeks as part of its education in safety. The cards are issued by an accident prevention committee which meets weekly and discusses the causes of every reported injury to person or property during the previous six days

ters lightly his assistants will treat them lightly. If he shows a strenuous desire to have working conditions safe and precautionary rules observed, if he makes the prevention of accidents one of the most important features of his department, then his fore-

men will reflect that feeling and will see that the men observe the precautions which are known to be necessary to the prevention of accidents. The leaven, therefore, must begin its work at the top and work downward to the men.

There are many different ways in which this problem may be attacked: by requiring the observance of concise and well developed rules for safety in operation as well as by the consistent use of all safety devices; by keeping the subject of safety constantly before the eyes and in the minds of the men; and by endeavoring to obtain the hearty cooperation of the men, to the end that each may constitute himself his brother's keeper.

In carrying on an organized educational campaign in the Illinois Steel Company, many schemes have been evolved. In the first place, all men are engaged through employment bureaus, and when hired are given a book of safety rules, printed in their own language. Later, they are examined by their foremen, at a period not longer than seven days after beginning work, as to their knowledge of these rules and their understanding of their work and how to avoid the dangers thereof.

In a similar booklet, entitled "To the New Man," the C. & N. W. Railway Company says:

"We hope you may be able to say at the end of many years' service, 'I was never injured and no one was ever injured through my fault.'" Another paragraph reads: "Remember, it takes less time to prevent an accident than to report one." And the final admonition is, "*In case of doubt adopt the safe course.*"

Among the schemes the Illinois Steel has used are competition between plants and departments for better accident records; prizes for records in accident prevention, "Boost for Safety" cigars, "Safety First" bulletin boards, "Safety First" dinner and lectures, "Boost for Safety" buttons given to each man upon passing his examination in the safety rules, illuminated gate signs at plant entrances displaying safety rules and sermonettes and monthly safety bulletins.

The greater the proportion of low-grade and non-English speaking help, the more elaborate must be the employer's plans. One idea which is being applied with considerable success, through the cooperation of the Y. M. C. A., is to combine instruc-

tion in safety and in English. Words are used which apply to operations in which the men daily are engaged. For instance, in the lessons to workers in a foundry, the words "spill" and "will burn" are emphasized in sentences like these:

SPILL—I must not *spill* the iron.

WILL BURN—Spilled iron *will burn* my feet.

Whenever possible the instructor acts out the sentence.

A red bull's-eye has widely been adopted as a safety emblem which speaks all languages and is printed on every safety device or danger sign.

An effort is also made to carry this movement into the homes and churches, asking the clergy to help. At one plant a banquet was given to the clergy of the town, where illustrated talks on safety were given, and it proved to be a very attractive and beneficial meeting. In one town which is essentially manufacturing, they have instituted a "Safety Sunday" in the churches. Lectures on safety also are given, in some cases illustrated by moving-picture films which have been carefully prepared to drive home the lesson of some sad accident due to a workingman "taking a chance." To these lectures the children and women are often invited, as managers have found that to get the families of the workers interested in accident prevention is to bring to bear a very effective outside influence. When mother sees the chances that father daily runs, she can be counted upon to take him rigorously to task for his acts of recklessness.

"Watch your step;" "It is better to cause a delay than an accident;" "Always play safe;" "Safety first;" "Never the same accident twice;" are some of the slogans which managers enforce upon the attention of their workmen at every possible opportunity—put up on placards about the factory, weave into the safety literature, interject in talks in meetings of workers, put on pay envelopes (Figure XXIV), flash on screens at night where workmen pass.

Human nature is fallible. Responsible foremen will at times be careless in selecting the proper and safe method of performing the work. A workman will do the wrong thing at a critical moment, or in the overconfidence of long association will grow careless in the handling of his machine or the performance of

his task, and the accident follows, causing injury to himself and others.

It is also often difficult to overcome the prejudice and opposition of the men themselves and cause them to realize the importance of utilizing safety devices provided, or exercising the proper degree of care for their own or others' safety. In the placing of workers, safety is therefore a prime consideration. Reckless men are either to be put where they can do themselves or their fellow-workers no harm, or they are discharged.

Evidently, therefore, while safeguards in general are essential, yet by far the most important element in the successful prevention of accidents is the elimination of carelessness.

Constant education and instruction and the most drastic of disciplinarian measures are the only weapons available. Eternal vigilance is the price of safety, and education in habits of caution is the fundamental requisite in any industrial plant which seeks to do effective work in accident prevention.

XXII

KEEPING WORKERS IN CONDITION

MEN, not materials, are the finished product of a factory." Thus epigrammatically did Frederick W. Taylor express his philosophy of management. In the final analysis, Taylor believed, the products of a factory reflect accurately the character of the organization. High standards of workmanship imply high-grade workmen. And in striving for higher standards, men necessarily are perfected. With the factory force, therefore, as with the vigorous, effective executive, keeping in condition—permanent, not intermittent reform—is of prime importance. If production schedules and standards of quality are unfailingly to be satisfied, the organization must achieve and hold a fighting edge, so that, as a unit and individually, it can deliver its full and best efforts day in and day out.

The process of keeping a force in trim mentally, physically and in spirit is often called welfare work. Service work is the less intrusive term adopted by the Joseph & Feiss Company, whose activities in behalf of the all-around development of their working people in many respects set the standard among the many concerns which are nowadays finding it good business to look after the health, the education, the social life and the prospects of employees.

How important the Joseph & Feiss Company regards such work is shown by the fact that the head of the service department—known generally as the superintendent of service—has powers second only to those of the general manager himself, and is one of the highest salaried persons in the organization. Employment, discipline, dismissal, training, health, recreative activities

—all are under the immediate direction of this department. In charge is a woman who is a college graduate and who previous to coming to the company was engaged in teaching and library work. Realizing that the success of this work depended very largely on the directing personality, the management spared no effort to obtain the best possible talent and spent months in the search. A large proportion of the Clothcraft workers are women, and one of their own sex practically is required to deal successfully with them. The men of the organization, however, have responded almost equally well to the superintendent's influence.

A worker comes in contact with the service department first when he is seriously considered as an applicant for engagement. The head of the department personally conducts the interview. Her special effort is directed toward learning the attitude of the prospective employee and his general fitness for the organization.

The applicant next is thoroughly informed as to the conditions of employment. Medical, ocular and dental examinations are required on occasion, at the expense of the management. The foreign-speaking applicant must also pledge himself to acquire English as quickly as possible. This rule is inflexible, as a good working knowledge of the language in which the business of the plant is carried on is deemed a prime essential to the worker who is to grow into the business.

By special arrangement with the Cleveland Board of Education, instruction in English is provided at the factory itself. Classes meet on alternate days between the hours of 4:30 and 5:30. In addition, the foremen are especially instructed to encourage the use of English during working hours, and care is exercised in assigning places at the dining tables not to seat together persons of the same nationality. The head of each table always is an English-speaking person chosen for his knack of engaging everyone in the conversation.

A gratifying result of the emphasis placed on English has been a marked increase in the interest shown by the American boys and girls in their foreign-speaking brothers and sisters.

In general, at the start and throughout service with the company, the management and service department tactfully but firmly discourage false ideas of dress and conduct. The appeal

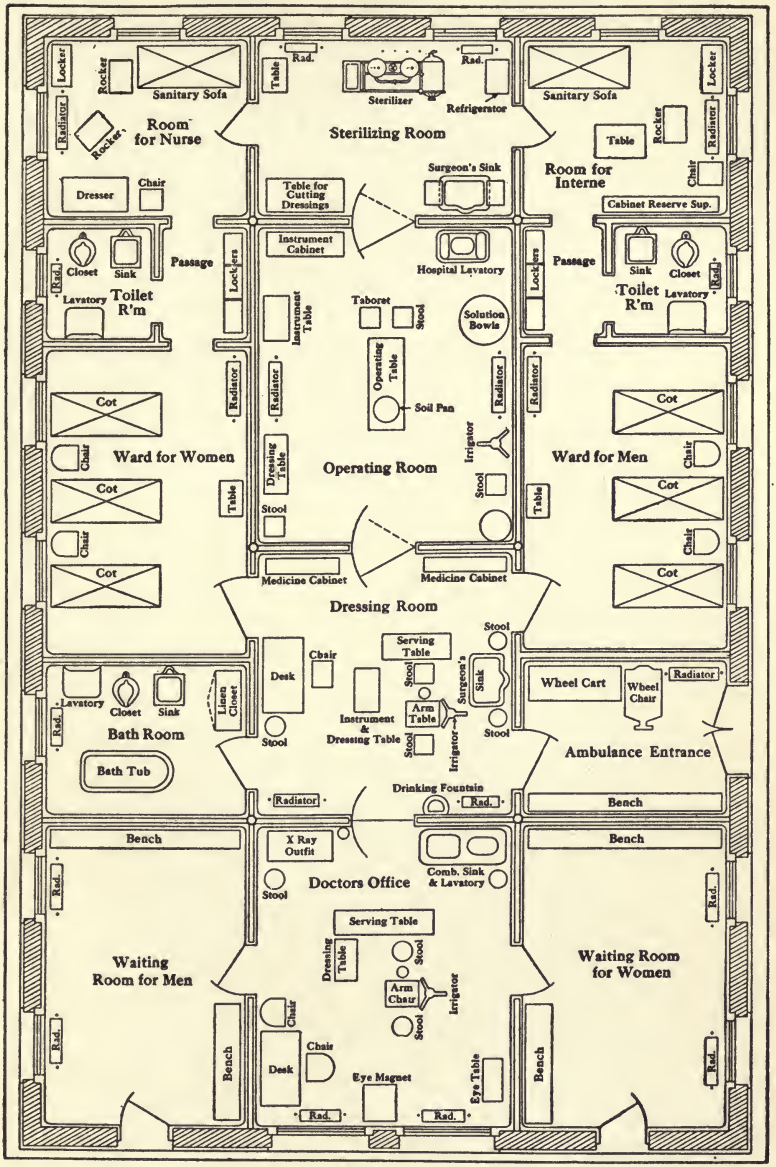


FIGURE XXV: When a man is injured much depends upon the quickness with which he may be given medical treatment. Time means money—for in case the company is at fault and the man dies because of lack of immediate treatment, the damages may more than pay for a hospital like this one at the plant of the Western Electric Company. It contains complete departments for the examination of applicants, and the care of employees during illness and following accidents

is made directly to the pride of the individual not to countenance any practice that is debilitating or retards development. "Clothcraft people do this—avoid that," the newcomer learns. Thus shop opinion spurs the worker to cooperate with the management in his development.

DISPENSARY AID AND INSTRUCTION THAT MAINTAINS THE HEALTH OF THE EMPLOYEES

FURTHER than the courtesies and the instruction which put the worker at his ease and in position to get ahead as his ability warrants, the most obvious occasion for service work comes by way of the dispensary. The plant has a well-equipped consultation room, with an examination table, a dental chair and cabinet, eye-charts and lenses, and a nurse's desk and couch. A nurse is in constant attendance. Two mornings a week a physician is on hand for consultation, one morning a week a dentist, and another an oculist. All this is free of expense to the workers, and if a needle accident necessitates a visit to the doctor's office or an X-ray photograph at a hospital, the firm also bears this expense. The dentist gives prophylactic treatments, and recommends as to repair work, on which he allows a discount at his own office. The oculist's services are free, and by special arrangement glasses may be had at a liberal discount.

Adjoining the dispensary are two rooms containing cots. These are for the accommodation of those who may become indisposed during working hours. Minor ailments or accidents are treated by the nurse. Some simple medicines are kept on hand, but are used sparingly.

As accidents are rare, the dispensary devotes its energies chiefly to preventive measures. The nurse is on duty every day, but many of her afternoons are spent in home visiting. When a worker is reported ill, she follows the case and is alert to see that he receives proper attention and is safeguarded against unscrupulous practitioners. Every morning she and the service head go over the list of absentees and decide whom to visit. If she finds an absence unwarranted, she reminds the absentee that irregular attendance is a cause of hardship to the other workers on the same operation, and to the organization—a form of selfish disregard for the rights of others. If the nurse

has not visited the absentee, on returning to work he will first report to the head of the service department and must give satisfactory reason. Anyone who is out for good cause is assured his own place or another equally good.

A large part of the nurse's service is to teach the workers the value of observing ordinary rules of right living. She "talks fresh air" for the sleeping room as well as at work, frequent bathing, proper diet, sensible clothing, regular exercise, avoidance of overtaxing the strength by heavy work at home and the bad effects of worry. The company furnishes for free distribution special pamphlets on various health topics, such as "Habits of Health," "Colds and Their Prevention" and "The Successful Woman."

Working conditions receive equally detailed attention. The sanitary facilities in particular most zealously are maintained. Ventilation, lighting and janitor service come under the service superintendent's care. A man is kept busy constantly renewing the wall finish, so that the workrooms always will be fresh and cheerful.

This care in the maintenance of the premises inevitably has its effect on the occupants. Foreigners who have been noticeably remiss have been observed to respond quickly in personal appearance and home conditions to the influence of a clean factory and fellow workers who already have learned to take pride in personal neatness.

The sanitary equipment includes a number of shower-baths which the operatives may use during working hours and many avail themselves of the opportunity.

In dining rooms provided separately for men and women, the company furnishes hot soup at two cents a bowl, coffee and tea at a cent a cup, milk at two cents a glass, box lunches at ten cents, and summer drinks in proportion. When the afternoons are hot a worker may, if he wishes, go to the "self-help" counter for ice cream or a cold drink during working hours.

Food and diet afford a large field for the raising of standards. Many of the workers need specific advice on the kind of food to eat and its preparation. The dispensary gives much general instruction on this subject, and it is a very important duty of the service workers.

Noon hour exercises also contribute to the well-being and effectiveness of the force. An ample playground adjoins the factory, where, in pleasant weather, the men play baseball and quoits, and the girls, captain ball, indoor baseball, three-deep, tag and crack the whip. When the weather is unfavorable, the workers adjourn to the recreation rooms. There is one for each sex. Workers may read or play games. The late magazines are kept on the reading tables. In the girls' room captain ball supplies recreation even on "indoor days."

Every section of the factory has its ball team for both men and women, and the scheduled games occur on the playgrounds sharply at 4:30, when work ceases for the day.

Certain days and seasons bring up various other activities that keep mind and body vigorous for the work. The burden of keeping workers in condition is not left to the annual picnic, enjoyable as it is. Every Wednesday noon the shop orchestra furnishes the music for a dance, in which practically the entire force take part. On Fridays, from 4:30 to 5:30, a choral club of two hundred and fifty members assembles, under a well-known musical director. This work is in anticipation of the annual concert in May. The choral club affords one of the most popular activities, and does much to promote good spirit throughout the factory. It encourages singing at work, which is a source and sign of health, good spirits and pleasure in the task.

HOW RECREATION AND AMUSEMENT HELP TO MAKE WORKERS CONTENTED

TO round out the social life of the organization, the service rooms of the factory are thrown open on Wednesday evenings for workers' parties. The initiative lies with the employees. Any section wishing to stay on Wednesday evening for supper and entertainment may do so by booking a date in the office of the service superintendent. Committees consisting of nine members each are then appointed by the foreman. These committees are three—a committee on arrangements, a refreshment committee and an entertainment committee; and the matter is entirely in their hands, although the service head stands ready to help if

asked. Friends and relatives are welcome at these evening gatherings. Social talent is encouraged by music and recitations, there are pantomimes and fortune-telling, and the different nationalities always are eager to dance their dances. Manager, superintendents, foremen and their wives mingle freely with the operatives on these neighborly occasions. The parties disband at nine o'clock, thereby setting a standard of proper hours.

An unusual feature for a factory is "Visiting Day," which is the first Friday afternoon of each month. The latch-string then is out to the families and friends of the workpeople, who are encouraged especially to invite their parents. It is a fact that in every case where a mother has been induced to come and see under what conditions her daughter works, she is in greater sympathy with the service aims. A Mother's Club is the latest device for winning over the parents to the welfare program.

The "Clothcraft Penny Bank" is another remarkably successful service feature. As in the other branches of the work, the endeavor here is to educate the people up to right standards by giving them reasons for the standards. The majority will save if they once make a beginning and frequently all that is necessary is to convince them that saving is a good thing. Often an immediate object can be improvised as the initial stimulus. Habitual saving has shown a decided stabilizing effect. In cases, earning capacity has increased fully fifty per cent, as a direct result. The greatest benefit obtains with operatives who hitherto have been compelled to turn over their entire earnings at home, but who now are allowed to retain all they can save above a certain amount. This margin is their bonus and they work zealously to have it as large as possible.

From the loan department, workers can borrow without interest up to a limited amount in cases of special necessity. This plan anticipates the loan-shark evil.

Believing that a vacation misspent is often a serious detriment to the worker's efficiency, the service department even interests itself in the vacation plans of the people. The entire work of the factory is suspended during the first week in September, so that all may have their holidays at the same time. For weeks in advance, the service department urges the making of definite plans. With no suggestion of meddling in private

affairs, it nevertheless keeps the recreative vacation before the workers with posters and circulars, giving information on inexpensive vacation cottages, camps and trips. Each year, as a result of the "vacation campaign," many people go to the woods and beaches who have never before been out of the city.

A branch of the city library at the plant supplies the workers with good reading. Once a week a delivery of books is made and those that no longer are needed are returned. The service department has its tactful ways to encourage systematic reading. Books of travel, biography, history, useful arts, as well as fiction, are on the shelves and the proportion of non-fiction books issued is surprisingly large. A factory library also is being built up, consisting of standard books and magazines on efficiency, business methods and management.

All the activities of the service department have for their direct object the improvement of the morals, minds and bodies of the workers. While the most direct benefit is to the individual and to society, the investment nets the business good returns in a more stable and efficient working force.

"Real prosperity rests on right and just relationship and on the true development of the workers," says Richard A. Feiss, general manager of the Clothcraft Shop, in summing up his reasons for the rarely extensive service work carried on in his organization. "That the right attitude of mind is an essential consideration in the art of management, is today well recognized. Whatever contributes toward bringing this about is worthy of the careful attention of the management."

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